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Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1918-1919

UNDER THE DIRECTION OF

LIEUT. COL. CHARLES W. KUTZ
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

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ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT OF COLUMBIA.

Lieut. Col. CHARLES W. KUTZ, *Corps of Engineers, United States Army, Engineer Commissioner.*
Capt. F. S. BESSON, *Corps of Engineers, United States Army, Assistant.*
Capt. CAREY H. BROWN, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONER.

RECORD DIVISION:
DANIEL E. GARGES, *Chief Clerk.*
WHARF COMMITTEE:
DANIEL E. GARGES, *Chief Clerk, Engineer Department.*
D. E. MCCOMB, *Engineer of Bridges.*
RUSSELL DEAN, *Harbor Master.*
DISTRICT BUILDING:
Capt. F. S. BESSON, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF CAPT. BESSON.

HIGHWAYS (STREETS, ROADS, BRIDGES, ETC.):
C. B. HUNT, *Engineer of Highways.*
J. W. DARE, *Assistant Engineer of Highways.*
Sidewalks and alleys—
H. N. MOSS, *Superintendent of Streets.*
Construction and maintenance of suburban roads—
L. R. GRABILL, *Superintendent of Suburban Roads.*
Construction and care of bridges—
D. E. MCCOMB, *Engineer of Bridges.*
Engineer Department Stables—
BART. J. LYNCH, *Superintendent.*
STREET AND ALLEY CLEANING, COLLECTION OF GARBAGE, ETC.:
MORRIS HACKER, *Supervisor of City Refuse.*
T. L. COSTIGAN, *Superintendent of Street Cleaning.*
ASPHALTS AND CEMENTS:
J. O. HARGROVE, *Inspector of Asphalts and Cements.*
SURVEYOR'S OFFICE (including street extensions):
M. C. HAZEN, *Surveyor.*
TREES AND PARKINGS:
CLIFFORD LANHAM, *Superintendent of Trees and Parkings.*
MUNICIPAL GARAGE:
E. P. BROOKE, *In charge.*
A. E. REIGLEMAN, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF CAPT. BROWN.

WATER DEPARTMENT:
J. S. GARLAND, *Superintendent.*
Water rates—
G. W. WALLACE, *Water Registrar and Chief Clerk.*
SEWER CONSTRUCTION AND MAINTENANCE:
ASA E. PHILLIPS, *Sanitary Engineer.*
MUNICIPAL ARCHITECT:
SNOWDEN ASHFORD.
Repairs to municipal buildings—
HENRY STOREY, *Superintendent of Repairs.*
BUILDING INSPECTION:
JOHN P. HEALY, *Inspector of Buildings.*
Plumbing plans and inspection—
A. R. MCGONEGAL, *Inspector of Plumbing.*
Permits, Engineer Department—
H. M. WOODWARD, *Permit Clerk.*
Plumbing board—
P. C. SCHAEFER.
J. S. O'HAGAN.
SAMUEL TAPP.
Board of examiners of steam engineers—
E. F. VERMILLION.
H. BOESCH.
W. I. EVANS.
ELECTRICAL DEPARTMENT.
WARREN B. HADLEY, *Electrical Engineer.*
BOARD FOR CONDEMNATION OF INSANITARY BUILDINGS:
Capt. CAREY H. BROWN, *Assistant to Engineer Commissioner.*
Dr. W. C. FOWLER, *Health Officer.*
JOHN P. HEALY, *Inspector of Buildings.*

EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1919.

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, October 1, 1919.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats., 108), a report of the official doings of that government for the fiscal year ended June 30, 1919.

* * * * * * *

ROADWAY PAVEMENTS.

The accompanying table shows the area, in square yards, of new roadway pavements laid and old roadway pavements resurfaced during the year, with the totals in square yards and miles of the various kinds of pavements at the close of the fiscal year.

Comparative statement showing character and extent of roadway pavements.

	Existing amount June 30, 1918.		New pavement laid during the year (square yards).	Replaced with asphalt.	Existing amount June 30, 1919.	
	Square yards.	Miles.			Square yards.	Miles.
Sheet asphalt and coal tar	3,157,757	167.78	46,604	.....	3,204,361	170.10
Asphalt block	626,222	31.75	5,546	1,132	630,636	32.05
Durax block	12,294	.30	.....	.....	12,294	.30
Asphaltic or bituminous concrete:						
On concrete base	78,708	4.58	.....	.....	78,708	4.58
On broken-stone base	51,088	2.68	.....	.....	51,088	2.68
Cement concrete	116,230	6.71	52,343	334	168,239	8.99
Granite block and rubble	406,035	22.03	.....	14,104	391,931	21.44
Vitrified block	17,390	1.04	.....	.....	17,390	1.04
Cobble	62,336	3.01	.....	201	62,135	3.00
Macadam (estimated)	1,942,907	123.76	34,320	[1] 46,103	1,931,124	124.05
Gravel and unimproved	.....	153.49	.....	.....	.....	151.28
Gutters and asphalt streets	226,161	.....	2,875	.....	229,036	.....
Gutters on asphaltic concrete	11,201	.....	.....	.....	11,201	.....
Pavements maintained by street railways	563,313	.....	1,212	.....	564,525	.....
Total	7,271,642	517.13	142,900	61,874	7,352,668	519.51

[1] Includes 19,196 square yards of concrete pavement.

NOTE.—9,381.29 square yards sheet asphalt and coal-tar pavements replaced, including 2,924.42 square yards asphalt surface on old base.

which practically no expenditures were needed as the pavements were only from 1 to 5 years old. The increase of 1919 over 1918 is entirely due to increased unit costs of labor and material.

SIDEWALKS AND ALLEYS.

The sum of $220,000 was appropriated for paving sidewalks and alleys in all parts of the District, and the sum of $25,000 for laying sidewalks and setting curbs around Government reservations, Government buildings, and parks. Sidewalks are paved with cement under contract, and alleys are paved with vitrified block or asphalt block and cement concrete. One thousand eight hundred and eighty-six square yards of vitrified block and 15,869 square yards of cement concrete pavement were laid in alleys. One-half the cost of curb, sidewalk, and alley paving is assessed against abutting property, except that abutting public buildings and public reservations.

The contract price for laying sidewalks during the year was as follows:

For large jobs adjoining paved streets, per square yard	$1.99
For large jobs adjoining unpaved streets and for all small jobs, per square yard	2.19

The initiative in the matter of paving sidewalks and alleys is generally left with the owners of abutting property, the commissioners requiring a majority petition for such work before it is ordered. Exceptions are made, however, in cases where, on account of public danger or other public reason, the paving is demanded. The law requires the commissioners to advertise for two weeks their intention to lay sidewalks and curbs and to pave alleys and to give a hearing to the property owners affected. The work is ordered subsequent to such hearing when, in the opinion of the commissioners, it is necessary for the public safety, health, comfort, and convenience. The demand for this class of construction is constant, and increased appropriations for this work could be advantageously expended.

BRIDGES.

The viaduct over tracks of the steam railroads at Bennings Road crossing was practically completed and this dangerous grade crossing thereby eliminated. A viaduct over the Baltimore & Ohio Railroad tracks on the line of South Dakota Avenue was placed under contract and is well advanced in construction.

The wharf used by the Norfolk & Washington Steamboat Co., which was destroyed by fire during the year, was rebuilt by day's labor from the proceeds of the fire insurance policies thereon and is approaching completion. Bids were asked, but none were received, for a new wharf on Water Street SW. between N and M. The funds available were insufficient and this fact deterred all bidders. Additional funds must be secured if this work is to be done.

Portions of the canal wall west of Georgetown were rebuilt by day's labor following the failure of the contractor for the work to carry out his contract. This work is still in progress. A number of culverts of major size were built.

SURVEYOR'S OFFICE.

The work done by the surveyor is of two classes, viz, that done for private parties and that done for the United States and the District of Columbia. For the work done for private parties fees are charged in accordance with a schedule approved by the commissioners. The total amount collected for such work during the year was $16,456.30 as compared with $9,565.15 during the previous fiscal year. This shows an increase of about 73 per cent, most of which was taken in during the last six months of the year. The number of surveys made was 1,584 as compared with 718 the previous year.

The number of surveys made for the United States and the District of Columbia, for which no fee is charged, were 2,437 as compared with 1,372 the previous year.

PARKS.

During the war the matter of parks has somewhat laid dormant on account of pressing governmental activities in other matters, but there are few projects that deserve more serious consideration than the acquisition of park area. The city is growing rapidly and crowding out into the undeveloped section of the District, and many places are being destroyed that should be preserved for all time for park purposes. The price of this sparsely settled land is now low, and citizens ride through it and use it for park purposes now, but the time is fast coming when it will not be available for park purposes, and it is urged that this matter be seriously considered before it is too late. Those which would seem to demand immediate attention are:

1. Piney Branch parkway, northeasterly from Sixteenth Street and Piney Branch.
2. The Klingle Road Valley.
3. Mount Hamilton, situated between Bladensburg Road and Eastern Branch.
4. Fort Drive, connecting Rock Creek Park by way of Fort Stevens, Fort Totten, Fort Bunker Hill, and the Eastern Branch Park.
5. Dean tract.

STREET AND ALLEY EXTENSIONS.

Five street and alley cases were confirmed in court during the past year, and there are now pending in court 20 cases. The amount of damages allowed in the five cases confirmed was $141,074.12, all of which is assessed against the property benefited.

A table appended to the report of the surveyor gives the status of all condemnation cases instituted by the District of Columbia where the proceedings have been taken or completed during the year.

ALLEYS.

An act approved September 25, 1914, known as the "alley law," was suspended by public act No. 156, approved May 23, 1918, for one year following the ratification of the treaty of peace. It is believed

steps should be taken to amend the original act. With the present crowded housing conditions in the District, nothing should be done to increase that condition. To drive some eight or ten thousand people now in alley houses out of those houses would seriously increase the present overcrowded condition. It is believed a number of amendments should be made to this law.

RESUBDIVISIONS OF SMALL LOTS.

At present many small garages are being built, and it is thought the subdivision regulations should be amended so as to permit smaller lots than 800 square feet each, as now provided by the regulations, so that these small garages can be placed on their own individual lots.

TREES AND PARKINGS.

The number of trees planted along the curbs in the streets of the District of Columbia at the close of the fiscal year was 104,254, a decrease under the preceding year of 363. The mileage of trees at the close of the year was 592.36, a decrease of 2.06 miles under the preceding year. The amount expended for the planting and care of trees during the year was $62,716.33.

It has been the practice to transplant young trees from the nurseries to permanent positions on the streets as rapidly as the surface conditions justify the undertaking of such work and also to replace trees in vacant spaces caused by the removal of trees for various reasons. Due to the scarcity of labor, this work could not be undertaken extensively during the year, and as a result there are many improved streets where trees have not been planted.

The two municipal nurseries, well stocked with trees, containing about 30 acres of ground, were taken from us, one by the Housing Corporation and the other for the Gallinger Hospital, and no permanent provision has been made for a nursery up to the present time. We are now occupying a small piece of ground known as Fort Dupont under a permit granted by the Chief of Engineers, United States Army. This permit is revocable at will. Approximately 5,000 trees were transferred from the municipal nursery located at Iowa Avenue and Webster Street to the new site. The transfer of this stock was a very difficult matter at the time, due to the scarcity of labor, the constant changes in the personnel of the gangs, and the great amount of preparation required on the unimproved ground. A permanent nursery is an immediate need if the extension of the tree system of Washington is to be maintained at its present standard.

During the year all trees in the entire southwest section of the city were trimmed. In the area covered by this treatment all trees were cleared of dead, low, and other objectionable branches, with the result that they were much improved in appearance. Owing to the scarcity of labor, it was not practicable, without neglecting other urgent work, to cover more territory than this, but it is a matter of growing importance that all of the large trees should receive this attention annually. The "floating gang" accomplished much trimming on individual requests. There is a great amount of trimming

necessary at this time which it is impossible to undertake extensively on account of the scarcity of skilled labor. The total number of trees trimmed during the year was 11,735.

STREET AND ALLEY CLEANING AND COLLECTION AND DISPOSAL OF CITY REFUSE.

The District of Columbia cleans the streets and alleys, collects the garbage, shipping it by railroad to Cherry Hill, Va., where it is reduced to grease and tankage.

Congress has authorized the commissioners, after July 1, 1919, to conduct as municipal functions the operations involved in the collection and disposal of city refuse of every kind. The ash service has been taken over and is now being performed by the District. This leaves but three such services still under contract, viz, the collection of miscellaneous refuse, the collection and disposal of dead animals, and the collection and disposal of night soil.

Street-cleaning cost $387,985.05

The following table shows the cost per 1,000 square yards of the various methods of street cleaning for the fiscal years 1915 to 1919, inclusive:

	1915	1916	1917	1918	1919
Hand patrol	$0.132	$0.132	$0.145	$0.189	$0.261
Machine sweeping	.149	.144	.171	.239	.354
Alley cleaning	.331	.326	.371	.603	.789
Squeegeeing	.115	.106	.121	.168	.625
Flushing	.194	.212	.285	.450	.497
Motor flushing				.314	.361

The increased cost is largely attributable to the higher wages paid laborers and drivers, which advanced from $1.75 and $2, respectively, in July, 1917, to $2.88 and $3.20 in October, 1918, in addition to which additional compensation of $120 a year was allotted to each regular employee.

By reason of shortage of funds after March 4, it became necessary to stop all hand patrol work and until well into the month of June to limit the cleaning to sweeping with machines.

This was the first year the District collected garbage directly and operated the reduction plant. It was found necessary to make material replacements and betterments to the plant and equipment turned over to the District by the Washington Fertilizer Co. Including the cost of the plant purchased, the cost of entire garbage service from July 1, 1918, to June 30, 1919, was $495,491.51, but this is to be credited with products sold to the amount of $230,328.97, making the net cost of plant and operation for the year $265,162.54.

Garbage was collected regularly during the year from 66,565 places, as follows:

Private residences	62,178
Small apartments	816
Lunch rooms and cafés	403
Hotels and miscellaneous institutions	137
Combination residences and stores	966
Stores	2,065

The cost of this garbage service was considerably greater than when done under contract. This is to be accounted for by the scarcity and high price of labor during the past year, as well as by the low price received for the grease and tankage produced from January 1 to June 30.

A small experiment was made, but not concluded, during the fiscal year in feeding garbage to hogs. Two hundred pigs averaging 100 pounds in weight, were purchased and established on the District farm at Blue Plains. It has been demonstrated that at the present price of pork garbage may be disposed of profitably by this means.

The service rendered by the contractors for the ash and refuse collections was seriously affected by the shortage of labor and the increased cost of both labor and material.

Upon the recommendation of the commissioners, an item of $22,000 was allowed by Congress for the adjustment of the ash contract, and this was paid the contractor in addition to his contract price of $78,300.

The contract for the collection of miscellaneous refuse had been let to John G. Faircloth for a period of three years, beginning July 1, 1918. A plant for the separation and salvaging of this trash had been built in Virginia near the end of the Highway Bridge. This plant was burned down in February, 1919, and following this the contract was assumed by J. J. Whitehead Co., who have built and are now operating a new plant at Mount Olivert Road and Montello Avenue.

Recommendations are made:

1. For an appropriation of $22,500 for the purchase of ground fronting on alleys and the erection thereon of 15 tool houses to take the place of properties which are now rented.

2. That the language of the next appropriation bill be changed so that funds arising from the sale of products from the disposal of city refuse will revert to the credit of the current appropriation instead of being covered into the Treasury.

3. For a change in the law which now permits the transportation by private individuals of table refuse to points outside of the District of Columbia to be fed to poultry and pigs.

4. For the acquisition of land and the erection thereon of three stables at points so located as to minimize hauling.

BUILDING OPERATIONS.

The estimated value of building operations, including repairs, etc., during the year, exclusive of buildings under construction by the Federal Government, is $10,509,291, an increase over the preceding year of $354,304.

The number of permits issued for all building construction work was 4,948, an increase of 1,042 over the fiscal year 1918. The total number of new buildings was 1,599, an increase of 642. Of these, 748 were dwellings, an increase of 217; 21 were apartments, an increase of 12; and 830 business buildings, an increase of 411. The number of repairs, etc., was 3,433, as against 2,610 the preceding year.

The estimated values of buildings and of repairs, etc., exclusive of awnings and signs, were distributed as follows:

	Buildings.	Repairs, etc.
t	$241,680	$113,159
t	276,745	111,017
t	2,899,437	1,342,260
t	252,900	74,507
	4,716,958	480,628
al	8,387,720 2,121,571	2,121,571
total	10,509,291	

estimated that there are in the District of Columbia 66,629 uildings and 27,010 frame buildings. There were 1,267 brick igs erected during the year and 332 frame buildings; 39 brick igs razed and 128 frame.

worthy of note that during the last three months of the year—May, June—the estimated cost of building operations was, re-ely, $2,112,231, $1,648,609 and $2,780,986, the largest amount ted for any previous month of the fiscal year being $951,570 in t. This is significant as showing the gain in building con-on since the close of the war and partial recovery from its im-te after effects. And this despite the unprecedentedly high building materials, the difficulty and uncertainty in the matter ivery, and the unsettled condition of labor and high wages de-d.

mits are issued upon the payment of a graduated scale of fees, are designed to cover the expense incurred in the administra-f the building inspector's office. Due to the slump in build-owever, during the past several years, this end has not been l by several thousand dollars; but if the prospects, as indi-by the last several months of the year, are realized, the fiscal 920 should show a balance between receipts and expenditures.

CONSTRUCTION OF MUNICIPAL BUILDINGS.

ing the year seven buildings were under construction as follows:

Building.	Location.
arf and Market	Water Street between Eleventh and Twelfth Streets SW.
h V. Brown School addition, No. 113	Connecticut Avenue, between McKinley and Northampton Streets NW.
rn School, No. 101, addition for toilets	Riggs and Blair Roads, Woodburn, D. C.
School, No. 48, addition for toilets	Anacostia Road, between Penning Road and F Street NE.
addition to McKinley Manual Training , No. 130.	Seventh Street and Rhode Island Avenue NW.
for Thelps School, No. 57	Vermont Avenue, between T and U Streets NW.
use and shed is on wharf used by the Norfolk & ngton Steamboat Co.	Water and Seventh Streets SW.

ans and specifications were prepared for 58 improvements. Ow-o war conditions, no appropriations were made for new school lings or additions to existing school buildings for the fiscal year d June 30, 1919. However, $231,000 was appropriated for the truction and erection of portable school buildings, including the

necessary grading, improvements, and toilet facilities. In this connection, 40 portable schools were erected in place of permanent buildings which could not be erected during the war.

Comparisons in the cubic cost of buildings erected during the year with buildings erected before the war show that frame or wooden buildings now cost as much as fireproof buildings formerly cost. Prior to the war, the noninflammable school buildings cost 17 cents per cubic foot, while the latest bids for such buildings show a cubic foot cost of 35 cents.

During the first half of the fiscal year building materials could not be obtained, and all building projects, except those directly connected with war work, were placed in the list of nonessentials. The scarcity of labor, the railroad embargoes, and the exhaustion of certain building materials required by the Government made it almost impossible to carry on construction work.

REPAIRS TO MUNICIPAL BUILDINGS.

All municipal buildings are kept in repair under the direction of the municipal architect. These include school buildings, engine houses, police stations, and the police court building. They number about 300 in all. The cost of repairs was much increased during the year, due to increases made in the wages of mechanics and laborers and increase in the cost of material.

In the report of the municipal architect will be found a memorandum on the subject of classroom ventilation which merits special attention.

WORKHOUSE AND REFORMATORY.

The report of the constructing engineer of the workhouse and reformatory is contained in the report of the municipal architect. This report shows the amount of construction work undertaken during the fiscal year. A system of bookkeeping has been adopted by which construction costs may be readily ascertained.

THE DISTRICT BUILDING.

The routine work incident to the care of the District Building involves several distinct functions, viz. the power plant; woodworking, paint, and electrical shops; blue prints and photo shop; printing shop; and the elevator, watch, and cleaning forces. During the year 1,915 tons of coal were consumed, a decrease of 398 tons as compared with the preceding year, due, no doubt, to the mild winter. The electric current generated and consumed amounted to 430,050 kilowatt hours, of which 285,300 kilowatt hours were used for lighting and 144,750 for power. Because of the shortage of labor a portion of the power plant was discontinued from 6 p. m. to 5 a. m. for a period of three months, during which time it became necessary to purchase from the Potomac Electric Power Co. 21,640 kilowatt hours at a cost of 2½ cents per kilowatt hour. The electrical department installed separate lines to the health and police departments for supplying power. Thirty-two thousand and ninety-nine square feet

of blue printing were completed, at a cost of $1,022.93. Six hundred and thirty-one photographs were completed, at a cost of $250.64.

The print shop did a business of $8,724.27, an increase of $3,951 as compared with the preceding year. The regular appropriation for the care of the building was $23,000, and a deficiency appropriation of $12,000 was made, principally for the purchase of coal.

CENTRAL GARAGE.

During the fiscal year ending June 30, 1919, there were maintained and kept in running order by this department 41 automobiles. The garage was necessarily kept open day and night, all machines being washed, supplied with oil and gas by the night force, who also served as watchmen. The laboring force of eight men made the necessary repairs. A battery-charging outfit has been installed. Total expense for maintenance of these cars including gas, oil, tires, and miscellaneous supplies amounted to $11,548.63, or an average of $0.0483 per mile. Repair parts amounted to $2,707.40, or an average of $0.0113 per mile. Average mileage for each car was 5,946 miles.

STABLES.

The stables located at First and Canal Streets SW. are used by the disbursing officer, sewer department, surface division, surveyor, department of weights, measures and markets, and assessor's office; those at U Street between Sixteenth and Seventeenth Streets NW. by the repair shop, sewer department, and the surface division. The employees at these stables include 1 blacksmith, 1 driver, and 3 watchmen on the annual roll, and 41 drivers, 5 stablemen, and 1 watchman on the per diem roll. The number of animals being cared for is 82, i. e., 49 horses and 33 mules. The average cost of forage for an animal for a year was $312.24.

PLUMBING AND PLUMBING INSPECTION.

During the year the plumbing office made 26,435 regular inspections compared with 25,995 during the preceding year. It is estimated that the total cost of new plumbing work installed in private buildings was $778,969, and of repairs and remodeling work, $561,870. The best available estimates of plumbing work done by the Housing Bureau, the Army, and other Government agencies is $1,800,000, making a total of more than three millions for plumbing in the District of Columbia. The average number of inspections per day per man, field inspection force, was 13¼, and the greatest number in any one day by any one man was 38. There were 20 police court cases for violation of the plumbing law, only one of which was dismissed by the court, and fines amounting to $122 were collected.

Under the compulsory drainage act, 41 cases were forwarded by the health department and other branches of the District government for the installation of sewer and water in those instances where the owner had failed to do the work after notice served upon him. In 16 of these cases the work was done by the owner or agent, in 4 of them the work was done by the District of Columbia and the cost assessed against the property, and there are 21 cases pending,

principally on account of the appropriation being exhausted within the first quarter of the fiscal year.

PLUMBING BOARD.

During the year the plumbing board held 24 sessions for the examination of candidates for license as master plumber and gas fitter. The total number examined was 29. The number of original candidates examined for license for master plumber and gas fitter was 14, of whom 2 passed. Of the 15 who had previously been examined for license, 3 passed and 12 failed.

INSPECTION OF STEAM BOILERS.

The number of steam boilers inspected by the inspector of steam boilers during the year was 431, including 35 for the District of Columbia, and 9 for the United States. Eight boilers were condemned as unfit for further use. The compensation of this official is received from fees paid by the owners of the boilers. The total amount of fees reported by him during the year was $2,155 and the expenses of inspection $320, leaving a net compensation to him of $1,835.

EXAMINATION OF STEAM ENGINEERS.

The board of examiners of steam engineers held 52 examinations and examined 129 applicants, of whom 49 were found competent and 80 not. The board also conducted examinations of applicants for permits of operators of automobiles and motorcycles.

PUBLIC CONVENIENCE STATIONS.

The four public convenience stations located at Seventh Street and Pennsylvania Avenue, Thirteen-and-a-half Street and Pennsylvania Avenue, and Ninth and K Streets NW., and Fifteenth and H Streets NE., were operated during the year from 6 a. m. to midnight with two shifts of attendants, each working nine hours per day. The stations were used over 13,000,000 times during the year and the receipts from pay closets and privileges amounted to $7,019.75, both being very great increases over last year. Plans for a fifth station at Eighth and F Streets NW. are complete, and locations for other stations are under consideration.

STREET LIGHTING.

There are 19,650 street lamps of all kinds in the District of Columbia, as follows:

Mantle gas	10,431
Electric arc:	
6.6-ampere magnetite	280
4-ampere magnetite	515
Electric incandescent:	
250-candlepower, series	10
200-candlepower, multiple	64
100-candlepower, series	3,772
100-candlepower, multiple	98

Electric incandescent—Continued.	
60-candlepower, series	3,637
60-candlepower, multiple	318
Street designation lamps:	
Gas	394
Electric	131
Total	19,650

This was a net increase during the year of 144 lamps.

The improved incandescent electric lighting was extended during the year in completion of treatment of area Seventeenth and Twenty-third, B and E Streets NW. in vicinity of new Federal Government buildings, on B Street NE. between First and Second, and by the addition of one lamp on Sixteenth Street NW., at Colorado Avenue.

The 64 4-glower Nernst lamps on Connecticut Avenue Bridge across Rock Creek were rated as obsolete by reason of commercial conditions and replaced by 64 200-candlepower filament lamps, effecting a better illumination at less annual cost.

LIGHTS ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against steam railroad companies to compel repayment for the sums expended by the District in maintaining lights along the respective rights of way of such companies has been affected only by the obtaining of a verdict and judgment for approximately $11,000 in a suit against Washington Terminal Co., followed by appeal to Court of Appeals. Further suits have been entered on newly accrued claims.

SIGNAL SYSTEMS—FIRE-ALARM, TELEGRAPH, POLICE PATROL SIGNALS, AND TELEPHONE SERVICE.

There were in service on June 30, 1919, 158.179 miles of underground cable, containing 6,301.206 miles of conductor. The aerial cable in service at the end of the year was about 5 miles, containing 164.71 miles of conductor. There were 1,357 telephones connected to the District system at the end of the year and 27 in use as portable sets by fire and electrical departments, a net increase of 41 in the year. There were 675 fire-alarm boxes in service at the end of the year, 573 on underground and 102 on overhead wires, an increase of 38 over the preceding year; 1,360 box fire alarms and 1,156 local alarms were received during the year, of which 246 box and 46 local were false.

ELECTRICAL INSPECTION.

At the end of the year there were 18,123 line and 981 guy poles of all kinds in overhead electric wire constructions in the District of Columbia, a net increase of 187 and 33, respectively, during the year.

The total number of inspections of wires and apparatus for electric light, heat, and power purposes, not including distribution plant of public-service companies, made during the year was 11,837, an increase of 1,779 over the preceding year. The total amount of fees paid for permits for such installations was $5,709, an increase of $505.93. The pronounced falling off in building operations during the year did not result in a diminution in the number of electrical

inspections. With resumption of building activity and by reason of growth in complexity as well as volume of business an increase of inspection force appears essential.

HARBOR FRONT.

The total amount received from the rental of wharves and river frontage placed by law under the direction of the commissioners was as follows:

Potomac River front	$16,395.60
Anacostia River front	322.50
	16,718.10

The actual water frontage in the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water frontage is about 18 miles, of which about 8 miles is set aside for parks and purposes of the United States. The largest amount of wharf property under control of the commissioners is along the Washington Channel. The total frontage along this channel is 9,275 linear feet, of which 4,675 linear feet, between the grounds of the War College and the south curb line of N street south, are under the control of the United States. Of the remaining 4,600 linear feet, 4,021 linear feet are under the jurisdiction of the commissioners, and 559 linear feet, between Thirteenth and Fourteenth Streets, has been designated by Congress as the site of the Federal central heat, light, and power plant.

Along the frontage under the control of the commissioners are located the harbor police station and dock of the harbor boathouse and dock of the fire boat, the District morgue, the municipal fish wharves and market, and a District property yard. The balance of the frontage is leased to private parties.

On the morning of September 2, 1918, the structures used and occupied by the Norfolk & Washington Steamboat Co. at the foot of Seventh Street SW. were destroyed by fire. The insurance available was not sufficient to replace the wharf, and an appropriation was obtained from Congress of $51,000. The wharf and office buildings have been replaced and are again occupied by the Norfolk & Washington Steamboat Co.

CONDEMNATION OF INSANITARY BUILDINGS.

The board for the condemnation of insanitary buildings held nine meetings and issued orders for the demolition of 116 buildings and the repair of 66 buildings.

Of the buildings ordered to be demolished, 71 were located on streets and 45 on alleys.

Since the creation of the board, May 1, 1906, it has examined 7,284 buildings, of which 2,265 were demolished and 1,700 repaired.

Of the buildings demolished, 1,529 were located on streets and 736 on alleys.

The estimated number of tenants required to secure other living quarters through the action of the board in the demolition of buildings since the creation of the board is 6,510.

The number of tenants benefited by repairs to buildings required to be repaired by the board is 5,796.

Estimated value of repairs required by the board for the year ended June 30, 1919, is $15,750.

The act of Congress approved September 25, 1914, declaring the use or occupation of any building or other structures erected or placed on or along any alley as a dwelling or residence or place of abode by any person or persons is injurious to life, to public health, morals, safety, and welfare of the District of Columbia, and such use or occupation of any such building or other structure on, from, and after the 1st day of July, 1918, shall be unlawful, was amended by an act of Congress approved May 23, 1918, which amendment provides "that the operation of the second paragraph of section 1 (relating to the use or occupation of alley buildings as dwellings) in the same hereby is postponed until the expiration of one year following the date of the proclamation by the President of the exchange of the ratifications of the treaty of peace between the United States and the Imperial German Government.

There is being made at this time a careful study of the conditions in the alleys of the city, and a census is being taken of the inhabitants of the same. An inspection and enumeration are also being made of the alley buildings. This survey of the alley conditions and buildings is being made with the view of correctly determining the number of dwellings now occupied as such and the number of alley dwellings demolished or converted to some other use since the creation of the board: also to determine the feasibility of extending some of the existing 30-foot alleys now used for dwellings to the abutting streets, making minor streets of the same.

SEWERS.

The construction and maintenance of the sewerage system and the sewage disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer, District of Columbia.

The length of main and pipe sewers constructed during the year was 7.98 miles. The total length of main and pipe sewers on June 30, 1919, was 738.82 miles, of which 147.79 miles are main sewers and 591.03 miles are pipe sewers. There was expended during the year on the sewerage system the sum of $282,028.55, and on the sewage disposal system, $83,337.33. The total cost of the sewerage system to June 30, 1919, was $14,231,065. The cost of the sewage disposal system to the same date was $4,803,662.25, making a total cost of the complete system to June 30, 1919, $19,034,727.25.

SEWER CONSTRUCTION.

The following table shows the length and cost of sewers constructed during the year:

Section.	Length.	Cost.
	Feet.	
1. County west of Rock Creek	11,984.07	$103,882.84
2. County east of Rock Creek	5,271.37	31,454.10
3. County west of Anacostia River	5,193.03	19,074.79
4. County east of Anacostia River	8,293.20	83,337.33
5. Washington City	11,526.67	97,616.82

In the informing report of the sanitary engineer will be found details of comprehensive drainage studies and continued consideration of river conditions as affected by sewage discharge. While the conditions of river waters at and below outfalls was generally very good, and throughout the year fair, yet they indicate the need in the future of the installation of sewage treatment works. The design of such works is under study.

Extracts from his report, relating to the sewage disposal system and the Metropolitan sewage district, follow:

SEWAGE DISPOSAL SYSTEM.

The main sewage pumping station was in continuous operation throughout the year, handling the sewage of practically the entire District and also the storm water from the 900-acre low area within the dike lines. At the main pumping station sewage to the amount of 25,388,879,000 gallons and 865,155,000 gallons of storm water were pumped during the year, an increase of 1,713,879,000 gallons of sewage over the amount pumped the previous fiscal year. At the Poplar Point pumping station 469,052,000 gallons of sewage were pumped, a decrease of 8,748,000 gallons over the quantity pumped during the previous fiscal year. At the Woodridge pumping station sewage to the amount of 14,519,000 gallons were pumped during the year.

The main sewage outfalls of the disposal system at Grimes, on the Potomac River, were under observation throughout the year, and the river conditions in the vicinity were given careful study. The condition of the river waters in the vicinity of the main outfalls and below was generally very good throughout the year, the beaches were free from any evidence of sewage discharge, and the surface waters clear of the sleek produced from oily wastes. The drop in oxygen content, however, below 50 per cent for the first time in the history of the disposal works may be considered as a warning that the installation of primary treatment works can not be safely deferred for a much longer period. Under appropriation already made, the site for these treatment works is now being acquired, and within the next 12 months it is proposed to submit estimates for beginning construction.

METROPOLITAN SEWERAGE DISTRICT.

The Metropolitan sewerage project, which contemplates the removal of all sewage from Maryland towns now entering small streams which flow into and through the national parks in the District of Columbia, provides for connecting the Maryland interceptors to be laid along the lines of these streams with the sewage disposal system of the District of Columbia. While the work of completing the necessary interceptors within the District is far advanced, no actual construction has been begun by the sanitary commission organized by the State of Maryland of the interceptors within the State and no beneficial results can accrue under the authority granted by Congress and by the State until these Maryland interceptors are built. Meanwhile, the serious contamination of park streams by the discharge of raw sewage from these Maryland towns is increasing, *and bacteriological* examinations of the waters of the streams indi-

cate that their purity is so affected as to render the spread of water-borne disease probable by children in the parks playing in these streams.

While war conditions unquestionably have had the effect of delaying the sewerage construction necessary to eliminate this stream pollution, it is believed that construction by the State should be begun without further delay in the interest not only of the national parks within the District of Columbia, but also in the interest of the Maryland communities themselves, which are polluting these small streams at their very doors.

This project was originally proposed in my annual report for the fiscal year 1909, from which the following is abstracted:

The only practical solution of this problem is believed to be in the formation of a Metropolitan district, under the control of a State and national board, with power to construct the necessary valley interceptors for the removal of the sewage, and that these interceptors be arranged so as to discharge at the State line into the interceptors of the sewage disposal system of the District of Columbia, the District to be reimbursed for the cost of pumping and handling the sewage from the Maryland towns and villages by a State-collected tax levied upon the communities benefited, which would also defray the cost of construction and maintenance of the State system.

The condition of the streams where they enter the District of Columbia has been under observation throughout the year, and the increase in their pollution by bacteriological determinations has been appreciable. These undesirable conditions are becoming more apparent on account of recent construction of sewerage systems in the bordering Maryland towns where sewage is discharged directly into these streams.

WATER MAINS.

During the year 47,688 feet, or 9.03 miles, of water mains of various sizes were laid, making a total length of mains now in the service of 633.1 miles. The aggregate cost of the water-distribution system to June 30, 1919, was $4,032,965.59. There were in service at the end of the year 3,610 fire hydrants, 233 public hydrants, 17 sanitary fountains, 156 horse fountains, 42 deep public wells, and 4 shallow wells.

WATER CONSUMPTION AND WASTE.

The per capita consumption of filtered Potomac water can not be given owing to the lack of information as to the present population of the District of Columbia, which has been largely augmented during the year on account of the influx of people due to the war. The total mean daily consumption for the year was 64,428,356 gallons, as compared with 59,606,970 gallons for the preceding year. This increase of practically 5,000,000 gallons per day is mainly owing to the increase in population, but to some extent is due to the large quantities of use and waste of water by the Federal Government and the District of Columbia. It is believed that the present water supply is ample for a population of 500,000 people if properly conserved, and this conservation can only be accomplished when all consumers, including the United States and the District of Columbia, pay for the water used. Neither the United States nor the District of Columbia is now charged for water used, and the only method of arriving at a proper charge would be by a valuation of the water

supply and distribution systems and the charging of a proper rate based upon a fair return on the investment.

The cost of operating the pumping engines at the District pumping station was $94,527.77. The total pumpage for the year was 11,253,358,880 gallons and the average daily amount pumped was 30,822,892 gallons. The amount of coal burned was 7,494.56 tons.

The underground leakage of water detected and prevented during the year was at the rate of 1,160,000 gallons per day, with an average waste per leak of 6,120 gallons per day. The principal cause of leakage was found in corroded iron services, and a large number of calked joints were found defective, indicating a severe leakage from this source. Most of the joint leaks were found in the old 6-inch mains, and but few were found in mains recently installed where sufficient calking was used. The cost of this leak investigation was $33,462.25 and the results based on the sale price of water at 4 cents per hundred cubic feet represents a 67 per cent return upon the investment.

WATER REVENUES AND EXPENDITURES.

The revenues from all sources during the year, including a balance of $199,780.73 brought forward, amounted to $1,016,412.38. The expenditures of the distribution system amounted to $676,548.99. Advances made on account of the Washington Aqueduct or supply system amount to $251,548.03. The balance, including $162,725.53 in the Treasury of the United States, $3,223.83 in the hands of the collector of taxes of the District of Columbia, and $51,697.99 in the hands of the disbursing officer of the District of Columbia, is $217,647.35. This balance is obligated to the extent of $87,176.86, leaving an unobligated balance under date of June 30, 1919, of $130,470.49. Of the total cost of the work during the year, 38.1 per cent was for new work and 61.9 per cent for maintenance.

WATER METERS.

During the fiscal year only 394 water meters have been installed, making a total number in use on June 30, 1919, of 61,299. The average cost of installing a meter in a private residence where the work is done by the District is $18.83, made up as follows: Cost of meter, $7.75; material, $5.12; labor, $5.96. The rate charged for water on metered services is 4 cents per hundred cubic feet for all used in excess of 7,500 cubic feet. The minimum charge to each premises allowing the use of 7,500 cubic feet, is $4.50 per annum. On unmetered services the rate for domestic purposes is charged according to stories and front feet. On all houses two stories high with a frontage of 16 feet or less the charge is $5 per annum, and for each additional front foot or fraction thereof there is added 31 cents to the charges as computed above. For each additional story there is added one-third of the charges as computed above. For business premises not metered the rates vary from $1 to $25 per annum. Where the rate is $25 or more a meter is required to be installed by the owner or occupant of the premises at his own expense. The amount of water rents collected under the flate-rate system was $75,808.29 and under the meter system $702,690.88. For water used in building construction the amount collected was $3,660.19, making a total of $782,159.3

In addition to this amount, the water revenues from other sources, such as water-main tax, charges for taps, etc., brought the total receipts up to $816,631.65. The estimated receipts for the fiscal year 1921 are $805,500. The total number of water services at the end of the fiscal year was $71,275, of which 61,299 are metered and 9,976 not metered, making a percentage of services metered 86.

ANACOSTIA PARK.

The total appropriations for this work amount to $1,175,000 and the total expenditures to August 31, 1919, were $888,322.40. There are outstanding liabilities to the amount of $58,196, and $9,490 are covered by existing contracts.

The balance available on August 31, 1919, was $218,991.60, and it is expected this balance will be expended by June 30, 1920.

The project is 35 per cent completed. This project is being executed under the direction of the Secretary of War, and the details of expenditures will be found in the annual report of the Chief of Engineers of the United States Army.

Respectfully submitted.

LOUIS BROWNLOW,
W. GWYNN GARDINER,
CHAS. W. KUTZ,
Commissioners of the District of Columbia.

REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA.

REPORT OF THE ASSISTANT ENGINEER COMMISSIONER.

OFFICE OF THE ENGINEER COMMISSIONER
OF THE DISTRICT OF COLUMBIA,
Washington, D. C., October 10, 1919.

SIR: I have the honor to transmit herewith annual reports giving in detail the operations during the fiscal year ended June 30, 1919, of the various divisions and offices under my supervision since February 24, 1919, I having taken over on that date certain of the duties previously assigned to Col. J. J. Loving, assistant to the Engineer Commissioner.

Very respectfully, F. S. BESSON,
Captain, Engineers, United States Army,
Assistant to the Engineer Commissioner.

To the ENGINEER COMMISSIONER.

REPORT OF ENGINEER OF HIGHWAYS.

WASHINGTON, D. C., *August 15, 1919.*

SIR: I have the honor to submit the following report of the operations of the engineer of highways for the fiscal year ended June 30, 1919. The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the surface division aggregated $1,556,090, of which $220,000 was for paving sidewalks and alleys in all parts of the District; $750,600 for paving new roadways and repairing old roadway pavements; $274,300 for construction and repair of suburban roads; $30,000 for construction and repair of bridges and viaducts; $30,000 for grading streets and avenues; $25,000 for sidewalks and curbs around Government reservations, buildings, and parks; $226,190.38 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

Summary of work under appropriation for improvements and repairs for year ended June 30, 1919.

Character of work.	Streets and avenues.	Suburban roads and streets.	Repairs to asphalt pavements	Total.
Sheet asphalt pavement.....square yards..	25,836.29	19,434.63	6,456.37	51,727.29
Asphalt surface.....do....	.....	.....	2,924.92	2,924.92
Asphalt block pavement.....do....	.....	5,546.44	.....	5,546.44
Vitrified block gutters.....do....	1,460.03	1,307.98	591.36	3,359.37
Cement concrete pavement.....do....	16,604.55	35,738.34	.....	52,342.89
Macadam roadway.....do....	.....	34,320.00	.....	34,320.00
Cobble and granite gutters.....do....	.....	5,950.89	.....	5,950.89
Old pavement removed.....cubic yards..	.....	.....	877.50	877.50
Old cobble and granite removed.....square yards..	15,742.33	2,386.82	.....	18,129.15
Granite and bluestone curb set.....linear feet..	7,407.66	5,576.21	2,389.41	15,373.28
Cement curb formed and laid.....do....	.....	16,484.19	.....	16,484.19
Curb reset.....do....	11,939.07	7,553.64	1,927.27	21,419.98
Grading.....cubic yards..	9,744.67	93,952.74	639.50	104,336.91
Sidewalks and curbs under assessment and permit work.....square yards..	.....	.....	.....	33,427.35
Sidewalks and curbs around Government reservations.....square yards..	.....	.....	.....	6,271.77
Sidewalks, whole cost.....do....	.....	.....	.....	701.00
Alley pavements:				
Vitrified block.....do....	.....	.....	.....	1,880.00
Cement.....do....	.....	.....	.....	15,869.00

The following is a list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1919.

Tables B and C.—Statement of character and extent of street pavements.

Table E.—Schedule of work on streets and avenues and county roads, and suburban streets.

Table F.—Repairs to asphalt and coal-tar pavements.

Table G.—Work done for street railway companies.

Table H.—Work done by day labor under appropriation for "Repairs to streets, avenues, and alleys."

Table I.—Regular permit work.

Table K.—Assessment work.

Table L.—Replacing and repairing sidewalks and curbs around public reservations.

Table M.—Miscellaneous work.

Table O.—Repairs to cuts by plumbers and others.

Table N.—Whole cost work.

Table P.—Grading streets, alleys, and roads.

Of the above tables, A, B, and C, and O, are printed herewith. The remaining tables are on file in the record room of the office of the engineer of highways, plan case No. "B-950."

The dominating characteristics of the year's work in its first half was scarcity of labor and material which was so pronounced that only construction work of a character essential to the conduct of the war was undertaken. Maintenance of streets and roads was emphasized but no construction contracts except for approaches to Government buildings were made until the spring of 1919. At that time the year's construction was placed under contract except the construction of suburban roads. All street construction appropriations, due to this enforced postponement of their expenditure were reappropriated as to their unexpended balances for the fiscal year 1920. It is believed that under contracts now made or under advertisement this entire construction program will be practically completed during the present working season, the asphalt portion by September.

The day labor activities were conducted under extreme difficulties and at high costs. The former conditions were ameliorated to a marked extent during the present working season but the latter show no reaction.

The concrete roadway pavements about to be placed under contract embrace about 45,000 square yards and the macadam roadways about 15,000 square yards.

Alleys were paved with cement concrete 15,869 square yards and vitrified block 1,886 square yards.

Sixteenth Street from Montague Street to Alaska Avenue, Massachusetts Avenue from Nebraska Avenue to the District line, and Rhode Island Avenue from South Dakota Avenue to the District line, were completed during the year, they being unfinished work of the preceding year delayed by war conditions.

The viaduct carrying Bennings Road over the steam railroad tracks was practically completed during the year, thus eliminating a grade crossing at that point.

Macadam stone for construction and repair of suburban roads was most largely of trap rock from the District's quarry at Dickerson, Md., with additional usage of limestone.

MUNICIPAL ASPHALT PLANT.

The total output of the municipal asphalt plant for the year was 169,392 cubic feet of material, consisting of 144,048 cubic feet of old material mixture, 23,976 cubic feet of asphaltic concrete mixture, and 1,368 cubic feet of topping mixture. The plant was operated for 240 days with an average daily output of 706 cubic feet. In connection with the output of the plant the crusher was operated for 77 days during the year and 3,451 cubic yards of old material hauled to the plant from the various streets was crushed.

Constant attention is given to the maintenance of both the plant and the crusher, repairs being made and parts replaced when necessary, thereby keeping them in the best operating condition possible. This cost is incorporated in the total cost of output shown below.

The following materials in amounts set forth below were purchased for use in manufacturing the output during the year:

Sand, 2,542.15 cubic yards, cost average	$2.105
Haul of bank sand, 61.5 cubic yards, cost	1.20
Asphaltic cement, 463.25 tons, cost	36.50
Asphaltic cement, 31.11 tons, cost	32.50
Screenings, 838 tons, cost average	1.425

There were purchased for use in operating the crushed and mixer the following large items:

Fuel oil, 32,338 gallons, cost	$0.09
Coal, 205 tons cost average	6.25
Wood, 26 cords, cost	10.00
Wood, 25 cords, cost	18.00

The cost of operation, including material and labor, are kept from day to day, and the summary of this data for the fiscal year develops the following unit costs for the year's operations:

OPERATION OF CRUSHER.

Period of operation, 77 working days; output of crusher, 3,451 cubic yards.

Labor and fuel	$4,528.71
Cost per cubic yard, $1.312.	
Maintenance, renewals, and repairs	186.17
Cost per cubic yard, $0.0539.	

Overhead costs: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

Cost of crused product per cubic yard:	
Labor and material	$1.312
Repairs to plant	.054
Total cost	1.366

OPERATION OF PLANT.

Period of operation, 240 days; total output, 169,392 cubic feet.

At plant:	
Labor (5.57 cents per cubic foot)	$9,441.68
Fuel oil (1.5 cents per cubic foot)	2,522.51
Coal (0.55 cent per cubic foot)	931.25
Wood (0.30 cent per cubic foot)	508.12
Total (7.92 cents per cubic foot)	13,403.56
Haul from plant to street:	
Labor (6.98 cents per cubic foot)	11,317.02
On street:	
Labor (27.35 cents per cubic foot)	44,349.67
Painting joints (0.69 cent per cubic foot)	1,125.30
Wood (0.20 cent per cubic foot)	331.88
Total (28.24 cents per cubic foot)	45,806.85
Maintenance and repairs:	
At plant (1.26 cents per cubic foot)	2,136.58
On street (0.61 cent per cubic foot)	989.48
Total, (1.87 cents per cubic foot)	3,126.06

Overhead: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

Supervision:	
Foremen and overseers (4.34 cents per cubic foot)	$7,356.00

Total manufacturing cost per cubic foot:	Cents.
Plant, labor	7.92
Hot haul	6.98
Street work	28.24
Maintenance of plant and tools	1.87
Supervision	4.34
	49.35

The sand used was bought under contract at 87½ cents (average) per cubic yard and hauled from the wharf to the plant at a cost of $3,133.12 for 2,542.15 cubic yards, or $1.23 per cubic yard, a total of $2.105 per cubic yard. In addition to this sand 61.5 cubic yards of bank sand were hauled to the plant and used in the various mixtures, the cost of this haul being $1.20 per cubic yard. All other expendable material was delivered at the plant site at the cost thereof used herein.

The cost of a cubic foot of old material mixture from the above was as follows:

0.60 cubic foot of old material, at $1.37 per cubic yard	$0.0304
0.34 cubic foot of sand at $0.875 per cubic yard, hauled $1.23 per cubic yard	.0264
2.10 pounds limestone dust, at $3.63 per ton	.0038
4.12[1] pounds asphaltic cement, at $35 per ton, plus freight at $1.50 per ton	.0724
Cost of material	.1330
Manufacturing and placing cost	.4935
Total cost per cubic foot	.6265

Asphaltic concrete mixture:	
0.50 cubic foot screenings at $1.425 per ton (2,000 pounds)	.0363
0.50 cubic foot sand, at $0.875 per cubic yard, haul $1.23 per cubic yard	.0390
4.20 pounds limestone dust, at $3.63 per ton	.0076
9.16[1] pounds asphaltic cement, at $35 per ton, plus freight, at $1.50 per ton	.1672
Cost of material	.2501
Manufacturing and placing cost	.4935
Total cost per cubic foot	.7436

Topping mixture:	
1.00 cubic foot of sand, at $0.875 per cubic yard, haul $1.23 per cubic yard	.0780
4.20 pounds limestone dust, at $3.63 per ton	.0076
9.16[1] pounds asphaltic cement, at $35 per ton, plus freight $1.50 per ton	.1672
Cost of Material	.2528
Manufacturing and placing cost	.4935
Total cost per cubic foot	.7463

The total cost of minor repairs to sheet-asphalt pavements during the year, the same representing the maintenance cost during the year was $97,068.13. This cost represented the maintenance of all asphalt streets not under guarantee by contractors, a total yardage of 3,157,757. The cost per square yard per year was therefore about 3.07 cents.

For purposes of record and comparison the like annual costs are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 cents.

[1] 10 per cent tare.

The municipal asphalt plant began operations in 1912, repairs being made by contract during the first quarter of that year and with the municipal asphalt plant during the last three quarters of that year and continuously since. The marked reduction for the year 1917 is affected very significantly by the law effective that year by which repairs to pavements over one year old is chargeable to repair appropriations instead of being paid for by the paving contractors under a five-year guarantee as formerly. The yardage of pavement over which our repairs were distributed was thus increased by nearly 700,000 square yards, on which practically no expenditures were needed as the pavements were only from 1 to 5 years old.

In connection with these costs of annual repair it should be considered that some of the streets approximate an age of 40 years and that the average age of those that we have resurfaced in recent past years exceed 25 years. The average age of streets resurfaced in 1910 was 25.8 years; in 1911 was 24.5 years; in 1912 was 25.8 years; in 1913 was 26 years; in 1914 was 28.5 years; in 1915 was 28 years; in 1916 was 29.6 years; in 1917 was 27 years; in 1918 was 26 years; and in 1919 was 26.7 years.

During the year there was purchased from the Cranford Paving Co., under contract No. 6507, the following material in bulk at contractor's plant, to be used in connection with the minor repairs to asphalt pavements and repairs to cuts:

21,496 cubic feet of topping, at 48 cents per cubic foot	$10,318.08
20,200.8 cubic feet of binder, at 35 cents per cubic foot	7,070.28
	17,388.36

This material was hauled from the plant and laid in the streets by the District of Columbia minor repair forces.

The reason for the above procedure was the abnormal need for repair work on our streets due to war activities and an effort to prevent their deterioration under such excessive use by heavy trucks and other increments of traffic. The plant alone could hardly have fully met such a demand and was not subjected to the injurious strain of attempting it. The prices paid for the material purchased were about equal to our own cost of production with a 15 per cent addition thereto.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

I transmit herewith the reports of the engineer of bridges, the superintendent of streets, the superintendent of suburban roads, and the superintendent of stables.

Very respectfully,

C. B. HUNT,
Engineer of Highways.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Statement showing employees temporarily required in connection with street, road, and bridge construction and repairs, and appropriations and deposits from which paid during fiscal year ended June 30, 1919:

SURFACE DIVISION.

Designation.	Number.	Rate per diem.
Assistant engineers	4	3, at $170 per month; 1, at $156 per month.
Inspectors	12	1, at $142 per month; 1, at $140 per month; 1, at $118 per month; 1, at $92 per month; and 8, at $4.50 per day.
Copyists	2	1, at $130 per month; 1, at $118 per month.
Computers	3	1, at $155 per month; 1, at $142 per month; 1, at $130 per month.
Overseers	12	1, at $150 per month; 1, at $140 per month; and 10, at $118 per month and $4.50 per day.

APPROPRIATIONS FOR WHICH PAID.

Improvements and repairs, District of Columbia, 1919	$42,956.34
Construction of suburban roads and suburban streets, District of Columbia, 1919	4,855.25
Bennings Viaduct	1,113.75
Deposit of Norfolk & Washington Steamboat Co	700.00
	49,625.34

Bridge No.	Character of work.		Cost
27	Connecticut Avenue over Klingle Road, repairs		$22
35	M Street over Rock Creek, paint		2
27	Connecticut Avenue over Klingle Road, repairs		4
27	Connecticut Avenue over Klingle Road, repairs to handrail		9
30	Calvert Street over Rock Creek, refloor		4,79
30	Calvert Street over Rock Creek, repairs		24
34	P Street over Rock Creek, repairs		16
	Portable field office		5
			5,65
	Dangerous holes and minor repairs:		
	July, 1918	$338.16	
	August, 1918	349.22	
	September, 1918	91.79	
	October, 1918	8.25	
	November, 1918	434.06	
	December, 1918	139.73	
	January, 1919	11.16	
	February, 1919	69.42	
	March, 1919	64.82	
	April, 1919	5.29	
	May, 1919	64.17	
	June, 1919	138.64	
			1,71
	Hire of horse and buggy		27
	Tools		
	Coal		4
	Salaries		5,10
	Lumber (estimated)		6,66
	Contract No. 6519		4,25
	Contract No. 6669		2,94
	Miscellaneous		72
			27,38
	Less materials purchased from previous appropriations		2,46
	Total net expenditures		24,92
	RECAPITULATION.		
	Appropriation		25,00
	Repayment by railway companies		3,01
			28,01
	Total net expenditures		24,92
	Balance		3,08
			28,01

The construction of a portable field office for use at the Benning Viad was completed at a cost of $57.48.

Bridge No. 30 (Calvert Street), reflooring completed with the exception dummy.

Lumber was purchased for reflooring half of bridge No. 54 (Pennsylva Avenue over the Anacostia River).

Reconstruction of a portion of the canal wall was readvertised, follow the failure of William F. Cush, contract No. 6355. Bid received from W. Murry & Co. was rejected and construction was ordered done by day la Construction in progress.

Contract No. 6519, which was entered into the previous fiscal year w Charles H. Tompkins, for the extension of culvert at the intersection of Blad burg Road and New York Avenue on the basis of cost plus 20 per cent completed at a cost of $6,896.45.

Contract No. 6669 was entered into with Charles H. Tompkins for the struction of culvert in Concord Avenue between Third and Fourth Stre Work completed at a cost of $3,509.

Contract No. 6475 with the Snare & Triest Co. for construction of the ning Viaduct was extended from April 12 to September 1. Work progress and nearly completed.

Wharf, Norfolk & Washington Steamboat Co., was practically destroyed fire. Insurance policies, to the benefit of the District of Columbia, aggregat

ɜ, were used for reconstruction by day labor. Reconstruction is
ng, but has been greatly delayed, due to inability to secure delivery
r.
between M and N Streets SW. Temporary occupation by the Norfolk
ngton Steamboat Co. has prevented readvertisement for proposals
struction of same. Plans and specifications were prepared and pro-
vited for this work during the previous fiscal year. No bids were

ct No. 6675 was entered into with Charles H. Tompkins for the con-
of a viaduct in the line of South Dakota Avenue NE., crossing
s of the Baltimore & Ohio Railroad, under an appropriation of $65,000.
progressing.
ct was made with the Shull Co. to furnish and install electrica
s in the south draw electrical machinery control house of the Anacostia
a cost of $135.
ost important projects for consideration are—
idening and strengthening of the Calvert Street Bridge, which was
in the estimates of this office for the next fiscal year. Estimated cost

No. 1, known as Chain Bridge, is about 3 miles above Georgetown
ects Canal Road with the Leesburg Turnpike in Virginia. It was
y the Phoenix Bridge Co. under a contract with the United States
vember 14, 1873, and was completed in March, 1874. It consists of
72 feet each and 2 spans 160 feet each. It will carry with safety a
d load of 75 pounds per square foot, or a concentrated vehicular
tons with 7½ feet wheel base, 5 feet gauge, or a concentrated load
with 15 feet wheel base, 5 feet gauge. In the year 1910 an outward
t of the abutment on the Virginia side was discovered, which was
l to heavy blasting in the adjacent quarry, which was shortly there-
ndoned. Steps were taken to discover if the movement was progres-
no evidence of progression has been discovered. The other abutment
are in reasonably good condition.
heel loads crossing bridges have increased so much in the past few
it it is difficult to prevent loads exceeding those permissible from
and for that reason this bridge should be replaced by a structure to
sent-day conditions. Because of the uncertainty as to the stability
irginia abutment that should be replaced. Estimates of the cost of
are in course of preparation.
ans prepared for the connecting parkway in Rock Creek Valley will
e replacement of the bridges at M and at P Streets to afford adequate
for the connecting driveways.

D. E. McComb,
Engineer of Bridges.

Engineer of Highways.

ORT OF THE SUPERINTENDENT OF STABLES.

Washington, D. C., *October 13, 1919.*

have the honor to submit the following report showing the operation
ables under the care of the superintendent of stables, engineer depart-
strict of Columbia, for the fiscal year ended June 30, 1919.
on of stables: First and Canal Streets SW.; U Street NW. between
and Seventeenth.
r of employees, annual: One superintendent, one blacksmith, one
nd three watchmen.
r of employees, per diem: Four stablemen, 1 watchman, and 39 drivers.

Number of horses and mules and departments to which assigned.

	Horses.	Mules.
Disbursing office	1	.....
Electrical department	1	.....
Repair shop	18	.....
Sewer department	7	21
Surface division	18	11
Surveyor	2	.....
Weights, measures, and markets	3	.....
Emergency	1	.....
Total	51	32

Cost of forage, etc., for animals.

Forage (allowance for 1 animal for 1 month):	
100 pounds rye straw, straight No. 2, at $0.96 per 100 pounds	$0.96
210 pounds long timothy hay, at $2.985 per 100 pounds	6.27
210 pounds mixed clover hay, at $1.992 per 100 pounds	4.18
384 pounds oats, at $2.47 per 100 pounds	9.48
50 pounds bran, at $2.09 per 100 pounds	1.05
Total per month	21.94
Forage for 1 animal for 1 year	263.28
Shoes, $1.35 per month	16.20
	279.48

B. J. LYNCH,
Superintendent of Stables.

To the ENGINEER OF HIGHWAYS.

TABLE A.—*Street railroads in operation in District of Columbia June 30, 1919.*

Name of company.	Underground electric.		Overhead electric.		Total.
	Double track.	Single track.	Double track.	Single track.	
Washington Railway & Electric Co	23.19	6.34	26.77	3.99	60.29
Capital Traction Co	20.19	4.30	3.57	.....	28.06
Washington & Virginia Co	.....	.46	.....	.....	.46
East Washington Traction Co	.....	.....	.....	.50	.50
Washington Interurban Co	.....	.....	.....	2.65	2.65
Washington & Maryland Co	.....	.....	.....	2.33	2.33
Total	43.38	11.10	30.34	9.47	94.29
Tracks used in common by Capital Traction Co. and Washington Railway & Electric Co	1.55	.....	.....	.....	1.55
Tracks used in common by Washington Railway & Electric Co. and Washington & Virginia Co	.70	.....	.....	.....	.70
Total	45.63	11.10	30.34	9.47	96.54

LES B AND C.—*Character and extent of roadway pavements July 1, 1919.*

SQUARE YARDS.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete	Durax block (small granite block).	Granite and rubble.
vest, city	1,783,967	25,323	9,674	6,372	17,489	12,294	103,334
ast, city	382,747	200,671	3,127	.....	.....	.....	18,289
ast, city	218,921	24[illegible],573	8,019	4,082	.....	.....	42,872
vest, city	270,002	40,436	13,535	.....	4,210	.....	160,354
town	153,972	23,075	4,144	905	.....	.....	36,166
vest, suburban	321,851	84,633	25,855	36,680	119,186	.....	23,945
ast, suburban	58,347	6,925	14,354	.....	18,814	.....	5,971
ast, suburban	14,494	.....	.....	3,049	8,540	.....	1,000
Total	3,204,361	630,636	78,708	51,088	168,239	12,294	391,931

Section.	Vitrified block.	Cobble.	Macadam (estimated).	Gutters on asphalt streets.	Gutters on asphaltic concrete streets.	Pavements maintained by street railroads.	Total.
vest, city	9,855	27,149	31,630	117,338	1,128	287,110	2,432,663
ast, city	3,882	.....	52,550	30,737	231	69,316	761,550
ast, city	.....	13,122	46,700	15,567	898	48,328	648,082
vest, city	3,138	9,246	10,300	23,906	1,254	56,820	593,261
town	515	12,618	3,000	5,750	498	31,816	272,459
vest, suburban	.....	.....	1,320,598	25,224	5,871	54,765	2,018,208
ast, suburban	.....	.....	385,975	4,881	1,049	9,000	505,316
st, suburban	.....	.....	80,371	5,633	272	7,370	120,729
otal	17,390	62,135	1,931,124	229,036	11,201	564,525	7,352,668

MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete	Durax block (small granite block).
vest, city	91.70	1.57	0.51	0.24	0.90	0.30
ast, city	19.93	8.99	.19	.....	.....	.....
ast, city	11.74	12.43	.43	.17	.....	.....
vest, city	14.68	2.37	.68	.....	.22	.....
town	9.14	1.51	.49	.06	.....	.....
vest, suburban	17.83	4.55	1.31	2.00	6.53	.....
ast, suburban	3.87	.63	.97	.....	1.04	.....
ast, suburban	1.21	.....	.....	.21	.30	.....
otal	170.10	32.05	4.58	2.68	8.99	.30

Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unimproved (estimated).	Total.
vest, city	5.61	0.50	1.29	1.00	2.54	106.76
ast, city	.91	.24	.....	2.96	4.75	37.97
ast, city	2.50	.....	.66	2.21	7.69	37.83
vest, city	8.25	.27	.41	.52	2.90	30.30
town, city	2.39	.03	.64	.06	.76	15.08
vest, suburban	1.13	.....	.....	82.95	54.31	170.61
ast, suburban	.61	.....	.....	27.45	42.75	77.32
st, suburban	.04	.....	.....	6.30	35.58	43.64
otal	21.44	1.04	3.00	124.05	151.28	519.51

TABLE O.—*Number of square yards and cost of repairs to cuts in streets, avenues, and alleys during the fiscal year ended June 30, 1919.*

Item No. 1 shows the cost of repairs to cuts charged various plumbers, public-service corporations, and individual depositors. Five per cent is added to "whole cost work" for the maintenance of the miscellaneous trust fund deposits (District of Columbia), operating account, streets, this fund being used to pay for labor, tools, various materials, etc., used in connection with the repairing of cuts.

Item No. 2 shows the cost of work done on account of various appropriations of the sewer department.

Item No. 3 shows the cost of work done on account of the water department.

Item No. 4 shows the cost of work charged against other appropriations of the District of Columbia and various appropriations of the General Government.

Item No. 5 shows the number of square yards of various kinds of pavements repaired.

PLUMBERS, PUBLIC-SERVICE CORPORATIONS, AND INDIVIDUAL DEPOSITORS.

	Flat rate.	Whole cost.	Total.
Item No. 1:			
Plumbers	$9,054.42	.....	$9,054.42
Corporations	45,588.86	$99,975.22	145,564.08
Individual depositors	7,625.96	4,468.95	12,094.91
Item No. 2:			
Sewer department	954.04	5,402.60	6,356.64
Item No. 3:			
Water department	5,516.84	14,216.68	19,733.52
Item No. 4:			
Miscellaneous appropriations	6,897.75	26,489.06	33,386.81
Total	75,637.87	150,552.51	226,190.38

	Square yards.		Total.
	Flat rate.	Whole cost.	
Item No. 5:			
Sheet asphalt	3,454.35	7,961.59	11,415.94
Vitrified block	860.56	2,611.01	3,415.57
Asphalt block	1,270.66	4,310.36	5,581.02
Brick	2,094.00	4,637.37	6,731.37
Cement sidewalk	8,984.71	.....	8,984.71
Granite block	890.26	3,528.88	4,419.14
Macadam	532.05	83.70	615.75
Concrete	41.68	133.08	174.76
Scoria and Durax	31.60	1,378.77	1,410.37
Wood block	8.33	.....	8.33
Cobble	188.78	174.79	363.57
Total	18,357.08	24,819.55	43,176.63

Total number of charges made for repairing cuts, etc., 8,038.

REPORT OF STREET CLEANING AND CITY REFUSE DIVISION.

WASHINGTON, D. C., *August 28, 1919.*

SIR: I have the honor to submit the following report of the operations of the street-cleaning division, engineer department, for the fiscal year ended June 30, 1919:

The operations of this division included in addition to the cleaning of streets and alleys, the collection and disposal of the garbage of the city and the supervision of contracts for the collection and disposal of ashes, trash, dead animals, and night soil.

The funds available to carry on this work during the year were as follows:

Streets: Dust prevention and cleaning, original appropriation $340,000, deficiency appropriation $34,000.

Paving yard at southeast street-cleaning stable, reappropriated, $5,000.

Disposal of city refuse, original appropriation, $608,997; deficiency appropriation, $220,000.

Adjustment of ash contract, $22,000.

STREET CLEANING.

he appropriation for the cleaning of streets for the year 1919 of $340,000 estimated for when labor was receiving a wage much lower than it was ssary to pay during the year covered by this report.

n July 1, 1917, the rate of pay for laborers was $1.75 and for drivers $2. ember 1, 1917, these rates were increased to $2 and $2.25, respectively. On ch 1, 1918, they were again increased to $2.25 and $2.50, and on April 1, , to $2.50 and $2.75. On July 1, 1918, they were $2.75 and $3, and on Octo- 1, 1918, they were increased to $2.88 and $3.20. During this year the pay for the months of July, August, September, and October was 60 per cent ter than for the same period during the previous year, notwithstanding the force employed during this year was only 88 per cent of that of the ious year. Similarly, during the months of November, December, January, February, the rate of pay involved an increase of 63 per cent over that of previous year, and in March, April, May, and June the increase in the rate ay was 33 per cent above that paid in those months during the previous . The consequence was that the appropriation proved inadequate to do the t properly, and it became necessary to request an appropriation to cover the cted deficiency. The Congress adjourned March 4 without passing the bill ring this deficiency appropriation, and after this date it became necessary p all hand-patrol work, to reduce the rate of pay of such men as were con- d to be employed to $2.70 per day, and to limit the cleaning force to sweep- rith machines. By using many of the street-cleaning teams on other work e engineer department and getting credit therefor by transfer vouchers and ligating, but not paying bills for forage, etc., it was possible to get through ear with a deficiency item of $34,000.

this $34,000, under authority of Congress, $6,000 was paid to laborers e pay had been reduced so as to make their rate of compensation for the d between March 5 to June 1, 1919, equal to the rate paid them prior to h 5, 1919. It is to be understood that in addition to the amount paid out ibor under appropriations made for street-cleaning work there was addi- l compensation allotted each regular employee of $120 per year.

snow and ice work whatever was done during the year, the weather being ld that such work was not necessary.

n measure of economy specific recommendation has been made in the esti- s for an appropriation of $22,500 for the purchase of ground fronting on s and the erection thereon of 15 tool houses to take the place of properties h the division now rents. This division now pays $1,782 yearly for the l of 13 such places and increased rent is being demanded.

bles similar to those furnished in previous reports are submitted showing omparison in cost of work done this year with past years.

GARBAGE COLLECTION AND DISPOSAL.

July 1, 1918, the District took over the plant and equipment of the Wash- n Fertilizer Co. and beginning with that date has collected the garbage perated the reduction plant at Cherry Hill, Va.

e plant and equipment was in such condition as to necessitate material icements and betterments. The yard where transfer is made of filled gar- tanks to railroad cars was in such wet and insanitary condition that it necessary to pave its entire surface.

e unloading facilities were insufficient, and a traveling crane was purchased se in the yard and an additional derrick for use at the reduction plant. ccount of the difficulty in securing sufficient labor and because of the over- ded situation of the city, motor trucks were hired to expedite the collection removal of the garbage, so that the cost of the collection service and of peration of the factory was much larger than it normally would be.

cluding cost of the plant purchased, the net cost of entire garbage service July 1, 1918, to June 30, 1919, was $265,162.54. At the reduction plant e was produced grease and tankage to the value of $230,328.97, which ey was covered into the Treasury of the United States, and this sum is med as a credit in showing the net cost of service given above.

arbage is collected from 62,178 private residences, 816 apartments, 403 lunch ns and cafés, 137 hotels and miscellaneous institutions, 966 combination resi- ces and stores, and from 2,065 stores; a total of 66,565 places.

A small experiment was made, but not concluded, during the fiscal year in feeding garbage to hogs. Two hundred pigs averaging 100 pounds in weight were purchased and established on the District farm at Blue Plains. It has been demonstrated that at the present price of pork garbage may be disposed of profitably by this means, but it can not be undertaken on a large scale unless the Congress is willing to permit the revenue from disposal to revert to the appropriation, so that when one lot of hogs is fattened and sold, another lot may be purchased and the operation made continuous. During a 12-month period such operation would involve the purchase and sale of three lots of hogs, each lot costing, at present prices, from $250,000 to $350,000. As an adjunct to the reduction plant and to absorb the garbage when it is excessive in bulk but poor in grease, it is believed pig feeding by the District could be successfully carried on.

For this reason the language of the next appropriation bill should be changed so that the commissioners could purchase hogs in such numbers as circumstances warranted and when fattened sell, and the revenue from garbage thereby materially increased without necessitating the enlargement of the present reduction plant. This plant is now too small, and it is not economical of operation. A new up-to-date plant must soon be built, but its capacity need not be so great if the peak of the load can be taken care of by feeding to hogs.

This can best be done at the reformatory at Occoquan. A railroad connection should be had with the Richmond, Fredericksburg & Potomac Railroad at Lorton, Va., and garbage switched to this point and there disposed of by the reduction process and by feeding to hogs.

The present law permits the transportation by private individuals of table refuse to points outside of the District of Columbia to be fed to poultry and pigs. This license is being taken advantage of by a number of pig feeders and results in disadvantage to the District in that the garbage richest in fats is selected for this purpose and the city is left the lean garbage to collect, so that the production of grease has fallen off noticeably since this law went into effect. Specific recommendation is made in the estimates for this division that this law be changed.

The cost of this garbage service was considerably greater than when done under contract. This is to be accounted for by the scarcity and high cost of labor during the past year as well as by the low price received for the grease and tankage produced from January 1 to June 30. In order to operate the service as efficiently and economically as possible, it is necessary that the commissioners be given the authority to operate it as a business proposition. They should be permitted to buy or sell hogs, grease, and other products, and as the market dictated, without the formality and delay of taking bids.

CITY WASTES.

The service rendered by the contractor for the ash and refuse collection was seriously affected by the shortage of labor and the increased cost of both labor and material. It was soon apparent that the ash contractor would be unable to carry out his contract without great loss. The matter was brought to the attention of the Congress and an item of $22,000 allowed by them for the adjustment of this contract in addition to his contract price of $78,300.

The contract for the collection of miscellaneous refuse had been let to John G. Faircloth for a period of three years, beginning July 1, 1918. A plant for the separation and salvaging of this trash had been built in Virginia near the end of the highway bridge. This plant burned down in February, 1919, and following this the contract was assumed by the J. J. Whitehead Co., who have built and are now operating a new plant at Mount Olivet Road and Montello Avenue.

Congress has authorized the commissioners after July 1, 1919, to conduct as municipal functions the operations involved in the collection and disposal of city refuse of every kind. The ash service has been taken over and is now being performed by the District. This leaves but three such services still under contract, viz: The collection of miscellaneous refuse, the collection and disposal of dead animals, and the collection and disposal of night soil.

If the trash service is to be taken over by the District at the termination of the present contract, provision for this work should be made in the 1921 appropriation bill, so that on July 1, 1921, the District will be prepared with plant and equipment to carry on this work. Recommendation has been made for appropriation to buy sites and erect three new stables at points so located as to minimize hauling. The work of cleaning streets, collecting garbage, ashes, and trash should be coordinated in the interest of economy.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

Very respectfully,

MORRIS HACKER,
Supervisor, City Refuse.

To Capt. F. S. BESSON, U. S. A.,
Assistant to the Engineer Commissioner.

Cost of street cleaning for year 1918–19.

	Area.	Cost.	
		Total.	Unit per thousand.
Machine cleaning	218,682,000	$77,555.50	$0.354
Alley cleaning	57,208,000	45,118.53	.789
Suburban cleaning	32,876,000	20,540.42	.625
Hand patrol	748,142,000	195,665.33	.261
Flushing	17,752,000	7,176.24	.404
Squeegeeing	89,868,000	20,929.32	.233
Sprinkling		5,262.02	
Sunday cleaning	3,895,000	395.73	.101
Dumpmen		5,503.09	
Property accounting		2,169.16	
Cost keeping		840.18	
Waste paper boxes		1,387.81	
Snow and ice		230.02	
Annual overhead		5,214.70	
Total		387,985.05	
*Washing total	748,142,000	223,770.89	.299

Yearly cost of cleaning by various methods.

Class of work.	Average thousand yards under attention.	Total cost.	Average cost for each thousand yards under attention for year.	Thousand yards cleaned.	Average number of cleanings for year.
Hand patrol [1]	3,668	$195,665.33	$53.35	748,142	204
Machine sweeping	1,790	77,555.50	43.33	218,682	122
Alley cleaning	1,173	45,118.53	38.47	57,208	49
Suburban streets	1,659	20,540.42	12.38	32,876	20
Squeegeeing	2,439	20,929.32	8.58	89,868	37
Flushing (horse and motor combined)	534	7,176.24	13.44	17,752	33

[1] Hand patrol work is habitually in combination with squeegeeing and flushing.

Table showing comparative data in connection with street-cleaning work, 1915 to 1919.

SQUARE YARDS CLEANED.

	1915	1916	1917	1918	1919
Hand patrol	1,027,020,000	1,052,765,000	1,024,688,000	879,574,000	748,142,000
Machine sweeping	217,235,000	218,852,000	219,869,000	205,504,000	218,682,000
Alley cleaning	66,206,000	67,842,000	65,471,000	49,878,000	57,208,000
Suburban streets	43,549,000	50,127,000	58,940,000	38,393,000	32,876,000
Squeegeeing	167,754,000	187,794,000	169,566,000	125,520,000	89,868,000
Flushing	26,304,000	23,696,000	27,485,000	16,776,000	5,539,000
Motor flushing			6,135,000	12,621,000	12,213,000

Table showing comparative data in connection with street-cleaning work, 1915 to 1919—Continued.

DIRECT TOTAL COST.

Class of work.	Average thousand yards under attention.	Total cost	Average cost for each thousand yards under attention for year.	Thousand yards cleaned.	Average number of cleanings for year.
Hand patrol	$135,553.98	$138,571.03	$148,401.40	$165,521.33	$195,665.33
Machine sweeping	32,378.12	31,405.83	37,583.20	49,242.68	77,555.50
Alley cleaning	21,914.70	22,155.20	24,221.64	30,018.51	45,118.53
Suburban streets	14,269.23	15,900.32	20,164.21	18,986.48	20,540.42
Squeegeeing	19,337.40	20,037.40	20,560.73	21,141.04	20,929.32
Flushing	5,099.30	5,033.32	7,829.54	7,566.84	2,757.63
Motor flushing	.....	.....	721.60	3,964.29	4,418.61

COST PER 1,000 SQUARE YARDS.

Hand patrol	$0.132	$0.132	$0.145	$0.189	$0.261
Machine sweeping	.149	.144	.171	.239	.354
Alley cleaning	.331	.326	.371	.603	.789
Squeegeeing	.115	.106	.121	.168	.625
Flushing	.194	.212	.285	.450	.497
Motor flushing	.....	.....	.....	.314	.361

Total cost of street cleaning, including all charges, except interest on investment and depreciation	$387,985.05
Population served	450,000
Cost per capita per year	$0.862

Table showing comparative data in connection with disposal of all city wastes from 1915 to 1919.

NUMBER OF UNITS COLLECTED.

	1915	1916	1917	1918	1919
Garbage ..... tons	50,806	52,207	44,683	48,874	53,258
Ashes ..... cubic yards	148,190	135,305	151,783	127,363	134,673
Miscellaneous refuse ..... do	146,152	157,180	149,810	163,291	149,650
Night soil ..... barrels	12,949	12,741	11,227	11,300	11,111
Dead animals ..... number	20,570	22,724	24,562	22,891	19,974

TOTAL NET COST.

Garbage	$68,374	$69,788	$69,756.00	$69,290.00	$267,662.54
Ashes	73,041	68,935	59,052.00	68,922.64	100,300.00
Miscellaneous refuse	16,609	28,187	27,954.25	26,318.75	51,204.00
Night soil	14,996	14,990	14,994.00	14,998.00	17,500.00
Dead animals	2,855	2,988	2,988.00	2,988.00	3,360.00

LIQUIDATED DAMAGES DEDUCTED.

Ashes	$109.00	$65.00	$948.00	$1,077.35	.....
Miscellaneous refuse	391.00	213.00	445.75	2,081.25	$2,796.00
Night soil	4.00	10.00	6.00	2.00	.....
Dead animals	.....	.....	.....	.....	.....

The table herewith gives a comparison of the number of complaints investigated by this division during the past two years:

	Ashes.				Refuse.			
	1918	Per cent.	1919	Per cent.	1918	Per cent.	1919	Per cent.
Complaints:								
Fault of contractor	1,633	57	1,386	43	1,504	53	4,671	76
Fault of householder	803	28	918	29	575	20	524	9
Doubtful	412	15	897	28	751	27	960	15
Total complaints	2,848	100	3,201	100	2,830	100	6,155	100
Total requests	237	.....	714	.....	223	.....	323	.....
Grand total	3,085	.....	3,915	.....	3,053	.....	6,478	.....

Miscellaneous data on contracts.

Class of waste.	Contractor.	Period of contract.	Date of expiration.	Price per annum.	Collected from—
Ashes	J. W. Bean Contracting Co.	1 year	June 30, 1919	$78,300	Residences, small boarding and lodging houses, small apartments.
Refuse	John G. Faircloth	3 years	June 30, 1921	[1] 54,000 [2] 35,400 [3] 15,000	Do.
Dead animals	Chas. F. Mann	5 years	June 30, 1923	3,360	Every part of the District.
Night soil	Warner Stutler	do	do	17,500	All privies in the District.

[1] First year. [2] Second year. [3] Third year.

Statement showing total cost of garbage service.

COLLECTION SERVICE.

Cost of plant and equipment	$35,110.00
Equipment purchased	28,219.41
Labor	140,313.57
Stock	29,867.42
Forage	28,461.67
Coal	1,110.00
Truck hire	33,379.85
Repairs to buildings	1,422.13
Paving yard at transfer station	14,348.22
Derrick hire	3,020.00
Livery	45.00
Freight, miscellaneous	8.01
Office pay roll	16,891.04
Miscellaneous expenses	6,990.37
Cost of collection service	339,186.69

REDUCTION SERVICE.

Cost of plant and equipment	$49,890.00
Equipment purchased	13,413.41
Labor	85,069.51
Stock	49,518.54
Forage	374.25
Coal	21,740.66
Freight on coal	12,106.58
Freight, miscellaneous	876.76
Freight on garbage cars	20,560.48
Rent of garbage cars	7,374.60
Car repairs	2,621.20
Chemical analysis	406.98
Supervision	6,200.04
Repairs to railroad siding	1,949.78
Miscellaneous expenses	1,227.22
Cost of reduction service	273,330.01

REDUCTION SERVICE.

Value of grease July 1, 1918, to May 31, 1919	$175,700.81	
Estimated value for June, 1919, 194,620 net pounds	12,747.61	
Total value of grease		$188,448.42
Value of tankage July 1, 1918, to May 31, 1919	40,306.55	
Estimated value for June, 1919, 260 tons	1,534.00	
Total value of tankage		41,840.55

Inventory June 30, 1919, original cost of plant and equipment July 1, 1918, $49,890 less 10 per cent depreciation		$44,901.00
Inventory June 30, 1919, equipment purchased, July 1, 1918, to June 30, 1919, $13,413.41 less 10 per cent depreciation		12,072.00
Receipts and inventory of equipment on hand June 30, 1919		287,261.97
Total cost of reduction service July 1, 1918, to June 30, 1919		273,330.01
Profit, July 1, 1918, to June 30, 1919, of reduction service		13,931.96

COLLECTION SERVICE.

Total cost of collection service July 1, 1918, to June 30, 1919		339,186.69
Inventory June 30, 1919, original cost of plant and equipment July 1, 1918, $35,110 less 10 per cent depreciation	$31,599.00	
Inventory June 30, 1919, equipment purchased, July 1, 1918, to June 30, 1919, $28,219.41, less 10 per cent depreciation	25,397.47	
		56,996.47
Net cost of collection service		282,190.22

HOG FEEDING.

Cost of hogs (200)		4,411.28
Stock purchased (material for pens, etc.)	$909.89	
Equipment (syringe)	1.25	
Miscellaneous payments	431.37	
Transfer vouchers	293.39	
Hauling garbage to hogs	357.10	
		1,993.00
Total cost of hogs, pens, labor, etc.		6,404.28
Inventory, June 30, 1919, hogs	$7,000.00	
Total cost of hogs, etc., June 30, 1919	6,404.28	
Profit on feeding garbage to hogs	595.72	

RECAPITULATION.

Net cost of collection service		282,190.22
Net profit on reduction service	$13,931.96	
Net profit on hog feeding service	595.72	
		14,527.68
Net cost of entire garbage service from July 1, 1918, to June 30, 1919		267,662.54

REPORT OF INSPECTOR OF ASPHALTS AND CEMENTS.

WASHINGTON, D. C., *August 15, 1919.*

SIR: I have the honor to submit the following report showing the operations of this division during the fiscal year ended June 30, 1919.

The volume of work of the division during the year was practically the same as during the preceding year, total number of samples tested being 9,347 against 9,358 during the year 1918.

ASPHALT PAVEMENTS.

During the year there were laid by the Cranford Paving Co., contractors for laying new asphalt pavements, approximately 45,270 square yards, in which Aztec, Bermudez, and Standard asphalts were used.

The Warner-Quinlan Co., contractors for repaving and resurfacing asphalt pavements, used Montezuma asphalt.

The municipal asphalt plant produced about 6,223 cubic yards of asphalt concrete and topping, used in the patching and repairs to asphalt pavements in which Aztec and Standard asphalts were used.

PORTLAND CEMENT.

Tested 7,757 samples, representing 77,611 barrels, of which 289 barrels were rejected. Results of tests and by whom submitted are shown in Table Nos. 7 and 8 accompanying.

During the year several new pieces of apparatus have been purchased and designed by the division, such as sieves, distilling apparatus, special thermometers, etc.

All work has been kept current and is current to date.

J. O. HARGROVE,
Inspector of Asphalts and Cements.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Total number of samples tested.

Asphalts:	
Aztec	27
Bermudez	2
Montezuma	1
Standard	8
Asphalt mixtures:	
Binder	14
Cement (binder)	156
Cement (topping)	164
Cement (District of Columbia asphalt plant)	227
Topping mixtures	392
Concrete mixtures	11
Toppping (old surface material)	10
Cement, Portland	7,757
Oils:	
Flux	1
Fuel	12
Road	14
Pitch, paving	3
Sands	328
Stone:	
Binder	40
Limestone dust	3
Trap-rock screenings	2
Miscellaneous	175
Total	9,347

NOTE.—The results of the above tests are on file in this office subject to reference.

REPORT OF THE SURVEYOR.

WASHINGTON, D. C., *August 26, 1919.*

SIR: The following report of the work of this office is herewith submitted, including the condemnation of streets, avenues, and alleys, for the fiscal year ended June 30, 1919.

PRIVATE SURVEYS, OR SURVEYS FOR WHICH A FEE IS CHARGED.

During the first six months of the past year this work compared about evenly with that done during the duration of the war, but the amount of work very maerially increased during the last six months of the year. With the office force not quite up to its prewar basis, it has been very difficult to keep the work current, some days as high as 50 orders for private work being received. This class of work must be done as soon as possible for the reason that operations of one kind or another are dependent upon the survey.

The number of orders left for work for the year ended June 30, 1918, was 2,200, as against 3,687 for the year ended June 30, 1919. The first six months of the past fiscal year 1,000 orders were received, while for the last six months 2,689 orders were received, this being more than double the number for the first six months and more than received during the entire preceding year. This is probably the record for the office.

The number of plats of various kinds made on the order of private parties for which a fee was charged was 3,348 against 1,850 for the preceding year.

All classes of work for the last six months of the past fiscal year showed a marked increase over that of the first six months, or of the entire preceding year. This was due to the great activity in building operations and the transfer of property throughout the District.

The total amount of money collected for this class of work, that is work done for private parties for which a fee is charged in accordance with schedule of fees fixed by the commissioners, amounted to $16,456.30, against $9,565.15 for the previous year. This shows an increase of about 73 per cent, most of which was received during the last six months.

Another class of surveys, and work not paid for, is that done for the Federal and District Governments. This work also has increased during the past year. A number of surveys were made for the Housing Corporation, the Walter Reed Hospital, and other departments of the Federal Government.

The total number of surveys made for the District of Columbia and private parties was 2,437, as compared with 1,372 for the previous year.

The following table is submitted as a matter of comparison and convenience, and will show the relation of the work for the past year with that of the previous year:

	Fiscal year 1917-18.	Fiscal year 1918-19.
FOR PRIVATE PARTIES		
Individual lots or parts of lots surveyed in city and county	2,576	1,859
Certificates of survey issued covering one or more lots	718	1,581
Duplicates of above recorded in survey certificate books	718	1,584
Separate surveys made to verify walls	518	694
Postal card reports concerning walls to owners	518	694
Individual buildings inspected as to location of new walls	1,060	1,044
Large tracts in county surveyed, subdivided, and recorded	6	6
Outline surveys in county of unsubdivided tracts	39	98
Subdivision plats prepared in duplicate	172	241
Duplicate subdivisions prepared for assessor	172	241
Subdivisions recorded	168	204
Total of individual new lots in subdivisions	2,262	1,480
Plats of one or more recorded lots to accompany applications for building permits (commonly called "building plats"), in duplicate	701	1,202
Plats made under regulations for theatres, stables, garages, etc	214	217
Estimates of cost issued in triplicate	2,200	3,687
Plats made up on order of private parties	1,850	3,348
Total of fees paid to collector of taxes by private parties	$ 9,565.15	$16,456.30
FOR THE DISTRICT OF COLUMBIA.		
Surveys for the District of Columbia	91	55
Plats recorded (condemnations, dedications, etc.)	56	28
Reports concerning walls to building inspector	533	694
Assessment and taxation plats recorded	130	225
MISCELLANEOUS.		
Total of surveys for the District of Columbia and private parties	1,372	2,437
Total of plats, public and private, including plats drawn in books	3,315	5,396

STREET EXTENSIONS AND CONDEMNATIONS.

This class of work relates to the opening, widening, straightening, or extension of streets and alleys by condemnation, the preparation of plats for dedication, and the changing of the permanent system of highways plan in certain sections where deemed advisable in accordance with the procedure prescribed by law.

In all condemnation cases for the acquisition of land for streets and alleys, survey plats and descriptions are prepared by this office to be filed with the petition in court. Seven new cases have been filed during the past year, and three additional ones recommended by this office but not yet filed. Five cases have

been confirmed during the past year, and there are still 20 cases pending in court. The amount of damages allowed in the five cases confirmed was $141,074.12, all of which is assessed against property benefited.

The following table will show the status of the cases now in court:

Condemnation cases.

STREET EXTENSIONS AND PARKS.

Location	Court docket No.	Case filed.	Verdict filed.	Verdict.		Remarks.
				Damages.	Benefits.	
Cathedral Avenue and Woodley Road.	1239	Apr. 20, 1915	.....	.....	.....	Abandoned by act of Congress.
Wisconsin Avenue between Garfield Street and District line.	1263	Feb. 4, 1916	Sept. 25, 1917	$107,392.00	$113,171.70	Mar. 4, 1919, verdict confirmed.
Building restriction line, Park Road and Mount Pleasant Street, square 2612.	1277	May 9, 1916	Mar. 4, 1918	.....	.....	July 11, 1918, motion of District of Columbia to confirm verdict.
Building restriction line, Columbia Road, square 2536.	1279	Sept. 27, 1916	.....	.....	.....	
Kenyon Street NW., Seventeenth Street to Mount Pleasant Street.	1288	Nov. 28, 1916	Jan. 25, 1918	13,152.96	13,660.36	July 12, 1918, order confirming verdict; appeal noted.
Shannon Place SE., square 5772.	1294	Mar. 13, 1917	.....	.....	.....	Continued from Feb. 1, 1919.
Widening Benning Road west of Anacostia River.	1296	Mar. 26, 1917	.....	.....	.....	June 13, 1919, report of jury on assessment area; June 14, 1919, plat of assessment area submitted.
Highway and Park along Anacostia River, parcels 211/4 and 211/7.	1297	.....do.....	.....	.....	.....	Continued from Apr. 12, 1917; verdict not yet filed.
Building restriction line, Newton Street NW., between Sixteenth and Seventeenth Streets.	1303	Apr. 14, 1917	.....	.....	.....	
Concord Avenue, between Fifth Street and New Hampshire Avenue; Riggs Road east of North Capitol Street; Kennedy Street, between Second Street and Concord Avenue; Longfellow Street, between Third Street and Concord Avenue.	1311	Sept. 29, 1917	July 12, 1918	11,183.54	12 167.39	Oct. 29, 1918, verdict confirmed.
Webster and Allison Streets between Arkansas Avenue and Fourteenth Street; Arkansas Avenue between Thirteenth and Sixteenth Streets.	1314	Jan. 30, 1918	.....	.....	.....	Continued to Sept. 20, 1919.
Forty-sixth Street, between Van Ness Street and Massachusetts Avenue.	1315	.....do.....	May 6, 1919	2,011 98	2,383.00	June 30, 1919, verdict confirmed.
South Dakota Avenue, from Vista Street to Bladensburg Road; Vista Street, from Franklin Street to South Dakota Avenue; Thirtieth Street, from Franklin Street to South Dakota Avenue.	1316	.....do.....	June 13, 1918	7,333.64	7,838.91	Aug. 8, 1918, verdict confirmed.

Condemnation Cases—Continued.

STREET EXTENSIONS AND PARKS.

Location.	Court docket No.	Case filed.	Verdict filed.	Verdict.		Remarks.
				Damages.	Benefits.	
Montana Avenue NE. between Rhode Island Avenue and Bryan Street.	1317	.....do.....	.....	.....	.....	Mar. 4, 1919, case dismissed by District of Columbia.
Fessenden Street NW., between Reno Road and Belt Road.	1318	.....do.....	June 25, 1919	.....	.....	Not yet confirmed.
Thirty-ninth Street NW., between Northampton Street and Chevy Chase Circle.	1326	May 29, 1918	.....	.....	.....	
Smallparks: Squares. 1483, W-1556, N-3376, and 3340.	1370	June 20, 1919	.....	.....	.....	
Seventeenth Street and Bryant Street NE., through parcels 143/15 and 154/9.	.....	.....	.....	.....	.....	Apr. 28, 1919, commissioners' order and plats to corporation counsel.

ALLEYS.

Square 2571.....	1286	Nov. 22, 1916	.....	.....	.....	
Squares 2831, 2842, 2685, and 3055.	1323	May 28, 1918	June 21, 1919	.....	.....	Not yet confirmed.
Squares 3572 and 3872.	1327	May 29, 1918	June 20, 1919	.....	.....	Do.
Square 5779.....	1339	Mar. 4, 1919	.....	.....	.....	
Square 744.....	1343	Mar. 25, 1919	June 30, 1919	.....	.....	Do.
Square 2588.....	1352	Mar. 29, 1919	.....do.....	.....	.....	Do.
Square 1010.....	1367	June 9, 1919	.....	.....	.....	
Squares 3561, 2661, 1053.	1368	.....do.....	.....	.....	.....	
Square 2907.....	1369	.....do.....	.....	.....	.....	
Square 3937.....	.....	.....	.....	.....	.....	Feb. 26, 1919, commissioners' order and plats to corporation counsel.
Square 2206.....	.....	.....	.....	.....	.....	May 17, 1919, commissioners' order and plats to corporation counsel.

PARKS.

During the war the matter of parks has somewhat laid dormant on account of the pressing governmental activities in other matters; but there are few projects that deserve more serious consideration than the acquisition of park area. This is particularly true at this time when the city is growing rapidly and crowding into the undeveloped sections of the District, and destroying many places that should be preserved for all time for park purposes. Parks promote the health and happiness of the inhabitants of large cities, and there are tracts that should be preserved in the interest of the Washington of the future. The price is now low; it will not always be cheap. This undeveloped land is sparsely settled and citizens ride through it and use it for park purposes now; but the time is fast coming when it will not be available for this purpose. In fact, already many of these spots have been destroyed. In the federal plan of the original city, which included all that part of the city below Florida Avenue, ample provision was made for parks, but beyond this no provision has been made. This matter should be seriously considered before it is too late.

Those areas which would seem to demand immediate attention I submit in the following order:

1. Piney Branch Parkway, northeasterly from Sixteenth Street and Piney Branch. This would seem to be the first one which should have consideration,

the reason that development is pushing in that direction so rapidly that s beautiful valley will soon be lost as a park.

. Klingle Road Valley. This should extend from the southerly entrance to k Creek Park along Klingle Road Valley, crossing Woodley Road at about rty-first Street, connecting with Normanstone Drive, which lies northerly of ssachusetts Avenue extended and the Naval Observatory. This link would nect Rock Creek Park with the Rock Creek connection now in process of uisition between Connecticut Avenue and the Potomac Park, and give a kway around the Zoo Park, which can not be considered as open to the lic at all hours.

his small link, if acquired, would make a continuous park from the southern its of Potomac Park to the northern limits of the District, at the northern remity of Rock Creek Park. There would be few such wonderful chains of ks in any city.

. Mount Hamilton, situated between Bladensburg Road and the Eastern nch. This has a beautiful elevation, well adapted for park purposes, and ered with a magnificent growth of trees, and is situated in the northeast tion, which is not now well provided with parks.

. Fort Drive connecting Rock Creek Park by way of Fort Stevens, Fort ten, Fort Bunker Hill, and the Eastern Branch Park. This is part of a t drive circling the entire city and connecting the various Civil War forts structed for the defense of Washington. These forts are of historic in- est, and in addition to providing a magnificent boulevard preserves many ces of historic interest. Already two have been acquired east of the Eastern anch, namely, Forts Davis and Dupont. This would make another link in s chain, and the reason for this particular link is that improvements are ing place very rapidly along this drive, making early action imperative if y are to be preserved.

. Dean tract. The Dean tract is another tract of land recommended for use a park by the Board of Trade. This would be quite desirable, but of course s a very expensive parcel of land.

From time to time $25,000 has been appropriated for the purchase of all parks in accordance with a map on file in this office. This is limited small triangular spaces at the intersection of streets. The law restricted commissioners to those indicated on the map on file in this office, and se have about been exhausted. The law should be changed so as to give commissioners general authority to select those which in their judgment suitable.

HIGHWAY PLAN.

In accordance with the present law the commissioners have authority to en by condemnation any street in accordance with the highway plan. This thority has been exercised in cases where in the judgment of the com- ssioners it was deemed in the public interests. The law provides that e entire cost shall be assessed as benefits. There are many cases where, this authority were exercised and the entire cost assessed, the proceeding ould amount practically to a confiscation of the property benefited. Either ere should be a general law authorizing the commissioners to institute con- mnation proceedings whenever in their judgment the public interests re- uire it, and allow the jury to assess a percentage of the cost against the roperty benefited, or there should be a law for each specific case. I would refer the first plan if that could be secured.

In connection with the condemnation of streets the last District appropria- ion act only allowed $40,000 for this purpose. This will interfere with this ork, and some of the important cases can not be handled for the reason hat the cost will exceed the limit fixed by law, as would have been the case n the widening of Wisconsin Avenue, the damages in that case amounting to bout $107,000. This provision should be repealed and the commissioners iven the same authority that they have always enjoyed, and which I am sure has never been abused.

ALLEYS.

An act approved September 25, 1914, known as the "alley law," was sus- pended by public act No. 156, approved May 23, 1918, for one year following the ratification of the treaty of peace. The same steps should be taken to

amend the original act. With the present crowded housing condition in the District of Columbia, nothing should be done to increase that condition. To drive some eight or ten thousand people now in alley houses out of those houses would seriously increase the present overcrowded condition. This office will be glad to prepare a bill covering this matter if the commissioners so direct. This office believes a number of amendments should be made to the present law.

The appropriation of $1,000 for the acquisition of land for alleys has been put to good advantage in acquiring small cut-offs.

At the present time many garages are being built to accommodate the great number of automobiles owned in the city. A permit can not be secured for the erection of these garages unless it is shown that they are erected on a lot or a parcel of ground surveyed. It is believed that the present regulations affecting subdivisions, which provide that a lot shall not contain less than 800 square feet or abut on an alley when practicable, should be changed so that small lots for garages can be created. This would be a benefit to the building inspector's office and many other offices in the District government, besides being a great benefit in the transfer of these garages to private owners, as this has to be done now by cumbersome metes and bounds descriptions.

A number of men who were in the service have returned to the office, and some are yet to return. During the year cheerful cooperation and help has been given by all of the members of the office; but in this connection I wish to emphasize the recommendations in the annual estimates for an increase in the pay of the men in this office.

Very respectfully,

MELVIN C. HAZEN,
Surveyor, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS.

WASHINGTON, D. C., *August 20, 1919.*

SIR: I have the honor to submit my third annual report dealing with the operations of the trees and parkings office for the fiscal year ended June 30, 1919.

TREES PLANTED, REMOVED, AND SPRAYED.

The systematic planting of young trees to their permanent positions on the streets has always been the most important feature of our work. I regret to state that in the past two years we have fallen behind in the work due to the extraordinary difficulties arising from adverse conditions created by war. Labor has been exceedingly scarce, and as a result there are many vacant tree spaces in the established lines of trees and also many improved streets where trees should be planted. We have at this time 3,021 tree holes listed for digging and planting, and it is the intention to make an extra effort during the present year to plant trees at these locations. No tree holes were prepared for planting during last fall. Labor conditions having improved somewhat during the late winter and early spring, an effort was made to plant a few trees. Our effort during the spring resulted in the transplanting of 758 young trees to their permanent position on the streets. Of the number planted 752 were set at the curb line, 5 in the parking between the inner edge of the sidewalk and the building line, and 1 in the center parking of Fourteenth Street NW., north of Montague Street. A decrease of 742 trees is noted in this work as against last year's record, which was 1,500 trees, and this was an unusually small planting for any one fiscal year.

Many fine trees necessarily fall a sacrifice to important street improvements throughout the city, from the mutilation of roots, the resetting of curb and laying of sidewalks, and laying of sewer and water pipes. It is the desire of this department to see that the total number of trees in the city does not diminish. Hundreds of trees die annually because of injuries over which this department has no control but has to bear the blame. Added to natural enemies, the unfavorable city conditions make the life of a street tree a hard one and it seems

plant trees unless their safety can be assured. The chief sources of
) shade trees are the general poor condition of the soil along the streets,
ı continually being impoverished by the growing tree and our inability
ize them because of the cement walks and pavements. Salt water
s used in the making of ice cream is responsible for the death of a
any trees. The oiling of roadways, I believe, is injurious to shade trees.
ly observed a prominent street where auto traffic was heavy and had
been oiled, and within two weeks the leaves of fine rows of trees had
ıd had every appearance of early falling. The dust laden with oil
e breathing pores on the leaves and I believe seriously injures them.
ıting gas is responsible for the death of and serious injury to many fine
believe the old system of calking pipes is not the proper method along
where the heavy vibration from the cars loosens the joints. During
· 1,233 trees were removed for various reasons. There was a decrease
rees over the number removed the previous year.
ɔraying of all trees on the streets, with the exception of Carolina poplars,
tulip poplars, and honey locust with arsenate of lead, for exterminа-
leaf-eating insects, was in progress at the beginning of the fiscal year
continued up to and including August 24, 1918. The leaf-eating insects
time had about all disappeared. Street trees are especially liable to
by insects and on May 5, 1919, spraying operations were resumed, and
ıd up to the close of the year. The elm trees throughout the city were
first to prevent their defoliation by the elm-leaf beetle. Immediately
trees of this variety had been sprayed, the lindens were given atten-
he foliage on these varieties are almost free of insects and in fine con-
: this time. I am quite sure that had spraying operations been deferred
insects made their appearance the foliage would have been devoured
ll trees infested could have been sprayed. Immediately after the work
ing the elms and lindens had been completed the past spring, this office
ɔk to spray all other trees on public space. At the close of the fiscal
ırly all trees in the northwest section south of Florida Avenue and
m North Capitol Street to Rock Creek had been sprayed.
ollowing statement shows the number and varieties of trees planted,
, and sprayed during the year:

Variety.	Planted.	Removed.	Sprayed.
.....	.....	3	298
.....	.....	1	.....
.....	.....	13	.....
ıorse.....	.....	3	212
.....	62	45	16,556
.....	32	22	.....
t.....	.....	.....	69
.....	3	61	9,887
.....	.....	7	.....
.....	.....	4	.....
y.....	180	195	6,102
.....	.....	5	626
.....	.....	165	14,495
.....	21	114	1,867
ɔre.....	1	.....	78
.....	.....	3	.....
.....	.....	9	229
.....	227	114	1,594
.....	148	107	759
·leaf.....	.....	7	.....
ge.....	8	.....	.....
.....	.....	1	.....
.....	.....	4	.....
.....	.....	6	.....
an.....	.....	8	.....
a.....	.....	42	.....
.....	.....	5	336
.....	.....	1	.....
.....	.....	1	.....
i. e. oriental plane.....	76	287	8,278
l.....	758	1,233	61,386

The planting, removal, and spraying of the above trees was paid for as designated below:

	Streets, District of Columbia, 1919, parking commission.	Appropriations for other departments.	Whole cost deposits.
Planting	748	.....	19
Removing	1,185	28	29
Spraying	61,386	.....	.....

Of the 1,233 trees removed during the year, 73 were dead, decayed, and dangerous; 9 were of inferior and condemned varieties; 30 to relieve excessive shade; 33 because of street improvements; 15 for driveways; 4 improvements of alleys; 39 accidents; 98 storms; 2 injurious to private property; 6 close proximity to buildings; 3 to accommodate lamps; 8 entrances to buildings; 2 parking improvements.

It was ascertained that 33 trees were destroyed by illuminating gas, 33 by salt water, 81 by abnormal moisture supply, 13 by being girdled, 20 by being filled around, 203 by drought, 57 by insects, scale, borers, sycamore louse, etc., 2 by gasoline, 11 by root mutilation, 4 by frost, and the deaths of 454 were unexplained.

Of the number removed, 1,115 stood at the curb line, 86 in the parkings, 11 in the sidewalk, 5 in the roadways, 14 in alleys, and 2 in playgrounds.

NURSERIES.

During the year this department had a most serious setback due to no fault of our own. Two nurseries well stocked with trees containing about 30 acres of ground was taken from us, one by the Housing Corporation and the other for the Gallinger Hospital, and no permanent provision has been made for a nursery up to this time. The Chief of Engineers, United States Army, granted us permission, revocable at will, to occupy a small piece of ground, known as Fort Dupont, containing about 16 acres. Only 4 acres on the tract has been cleared and we are forbidden to clear any more ground. Nearly all employees with our own teams accomplished the transfer of fencing, one building, and approximately 5,000 trees from the municipal nursery located at the intersection of Iowa Avenue and Webster Street, NW., to the new site, after preparing the recently acquired ground, repairing certain buildings, and building a road. This work was started in October and finished in March at an expense of approximately $10,000. The scarcity of labor and the constant changes in the personnel of the gangs and the great amount of preparation required on this unimproved ground made the transfer a very difficult matter at the time, and, of course, made it necessary to discontinue nearly all other outside work until it was completed. It is the desire of this office to have this site transferred permanently to this department. If this transfer is not made I can not imagine what will be done for trees in the coming years. A nursery is an immediate need, as seed must be sowed each year so as to enable us to have trees coming all the time.

TRIMMING.

During the year all trees in the entire southwest section of the city were trimmed. In the area covered by this treatment all trees were cleared of dead, low, and other objectionable branches, with the result that they were much improved in appearance. Owing to the scarcity of labor, it was not practicable, without neglecting other urgent work, to cover more territory than this, but it is a matter of growing importance that all of the large trees should receive this attention annually. The silver maples are responsible for the largest outlay in trimming, this variety being planted years ago to the exclusion of many kinds whose subsequent use has proved more advantageous. This tree, as a street variety, is noted for the early decay of its branches and requires close attention to keep it in proper condition. In addition to the above, the "floating gang" accomplished much trimming on individual requests. If trees

ınted along the street are to become symmetrical and strong, it is necessary prune and train them. The most important pruning is required at the time transplanting. It is then a tree is trimmed up and trained accordingly to condition at the time, the characteristic style and method of growth, and ɴe of head which is desired. Unless cared for, trees acquire a greater or s amount of deadwood. In the struggle for existence many branches fall t of the race. When crowded, trees prune themselves, lower limbs often die ɔm the shade of higher branches. Insects and fungous diseases, mechanical 'uries, winter killing of the roots and crown, lack of mineral food and ɔisture, and other causes play a part in the formation of deadwood. What-ɜr the cause, dead limbs must not be neglected. A total of 11,735 trees were mmed during the year.

TREE SURGERY.

Where, for any reason, a wound exists, and the inner wood is exposed, the ıubium at once attempts to cover it. This is brought about by a sort of lling of the cambium out over the exposed wood. This growth of callous kes place mostly from the side and upper part of the wound, owing to the wnward flow of the sap. Whenever a dead branch, or even the stub of one, mains upon a tree, the cambium vainly endeavors to heal the wound, although thing can be accomplished. The new bark may protrude an inch or two along e branch, but farther it can not go. This condition is to be seen on every nd, and on a beautiful old tree it is pathetic. If the limb is not removed at ls stage, decay eats back into the trunk, and by the time the stub has rotted fficiently to fall of its own accord an ugly cavity has formed in the ınk. A cavity in a tree is really a serious matter. Even a small fissure on e of the upper branches may kill a tree in time, owing to the spreading of e decay from one branch to another and finally down into the trunk. It is possible for the bark to heal over a large cavity, as there is no support for e cambium to roll on. Such a cavity will rapidly increase in size until the tire trunk is hollow, and the tree goes down under its own weight or before strong wind. It is necessary that some surface should be present on which e cambium may roll. The cavity should also be filled in order to make the ɴe sound once more, and this must be done in such a way that the decay is rmanently checked and the trouble remedied for all times. All decayed and ɪeased tissues must be removed from a cavity until nothing but sound wood nains. A heavy application of coal tar is applied to the interior, and the vity is then filled with cement. Considerable skill is required to do expert ırk of this kind, and the filling of a decayed tooth by a dentist requires no ɔre care than the proper treatment of a cavity in a valuable tree. The cavi-s in 321 trees were treated. The following shows the location, kind, and mber of trees cemented:

Kind.	Curb.	Parking.
n	1	.....
ıden	255	61
ıple:		
Red	1	.....
Silver	3	.....
Total	260	61

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES.

At the beginning of the fiscal year nearly all the force was engaged in the ıowing of weeds on parkings abutting unimproved property, also the cultiva-on of all young trees throughout the city; this work was carried on until the ntire tree-planted streets had received this attention. It is deemed necessary o rid the city of as many weeds as possible. An overgrowth of weeds on the ıarkings and in the tree spaces throughout the city spoils the good appearance ɔf a street, and many complaints are received each year before the entire city can be covered, especially in the outlying districts.

Few persons realize that it is necessary to cultivate recently planted trees after they have been transplanted to their permanent position on a street. This, however, is very important. Grass should not be allowed to grow around the base of a young tree for the first few years after planting. Keeping the top soil loose by cultivating it at intervals increases its capacity for taking in moisture, checks evaporation, and promotes growth. More trees suffer from starvation than anything else. On lawns as on sidewalks a tree's natural food (fallen leaves, etc.) is taken away, water is denied, and both rain and air are excluded by close pavement, or by sod. The consequent weakened condition induces disease and insect attack. After last spring's planting had been completed, the work of again cultivating all small trees and removing dirt from recently planted trees throughout the city was undertaken, and this work had been completed at the close of the year. The young trees having all received the usual spring cultivation, we undertook the work of removing weeds and undergrowth from the public space abutting unimproved private property, and this work will receive our attention until the entire city is again covered.

A total of 960 wooden tree boxes and iron tree guards were removed during the year from trees which no longer required their protection. The wooden tree boxes can not be used again. The iron guards removed will be painted and can be used on other small trees requiring protection.

REGULATION OF TERRACES.

This office examined and issued 415 permits affecting terraces during the year. The regulation of terraces throughout the city is proceeding satisfactorily, and this office has had very little trouble with the builders regarding the proper treatment of the parking.

About the last of May just past, this office was relieved of the duty of passing on applications for the erection of fences, wickets, etc., planting hedges, and constructing cement copings on public space. These duties were transferred to the permit clerk, District of Columbia.

PAVING OF ABANDONED TREE SPACES.

The work of paving abandoned tree spaces throughout the city during the year was performed by the surface division, engineer department, and the cost of the work paid from the appropriation for the parking commission. A total of $470.29 was spent on this work.

SUMMARY.

Curb trees on streets at close of fiscal year 1918	104,617
Net decrease of curb trees during the fiscal year 1919	363
Curb trees on streets at close of fiscal year 1919	104,254
Mileage of trees at close of fiscal year 1918	594.42
Decrease of mileage of trees, fiscal year 1919	2.06
Mileage of trees at close of fiscal year 1919	592.36
Mileage of tree-planted streets at close of fiscal year 1918	297.21
Decrease of mileage of tree-planted streets at close of fiscal year 1919	1.03
Mileage of tree-planted streets at close of fiscal year 1919	296.18

NOTE.—Mileage is figured on the basis of 352 trees to the mile.

APPROPRIATIONS.

By appropriation "Streets, District of Columbia, 1919, parking commission"	$60,000.00
By repayment to above appropriation	2,716.33
Total	62,716.33

Labor	$46,796.20
Materials	12,004.33
Charges against appropriation	3,449.20
To balance of above appropriation, unexpended	466.60
Total	62,716.33
Expenditures from miscellaneous appropriations, exclusive of parking commission	2,716.33

I wish to record my appreciation of the employees of the department, who have worked faithfully and efficiently during the year.

Very respectfully,

C. LANHAM,
Superintendent of Trees and Parkings, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF THE MUNICIPAL GARAGE.

WASHINGTON, D. C., *August 21, 1919.*

SIR: I have the honor to submit the following report on the "Care and maintenance of automobiles in the municipal garage."

For the fiscal year ending June 30, 1919, this department maintained and kept in running condition 41 automobiles for the various departments of the District government.

This garage has necessarily kept open day and night during the entire year, some of the automobiles being pressed into service at night. All machines were washed, supplied with oil and gas by the night force, who also served as watchmen.

The laboring force consisted of eight men, keeping the machines in repair, maintaining them, and driving for departments which did not have automobiles or drivers allotted to their respective departments.

A battery-charging outfit has been installed, which is sufficient to take care of all the batteries used by machines in the garage.

The total running expense on these cars for gas, oil, tires, and miscellaneous supplies, amounted to $11,548.63, or an average of $66.03 for each car, or $0.0483 per mile.

Repair parts amounted to $2,707.40, or an average of $66.03 for each car, or $0.0113 per mile.

Average mileage for each car traveled was 5,946 miles.

A. E. REIGELMAN,
Superintendent Municipal Garage.

ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF THE ASSISTANT ENGINEER COMMISSIONER.

OFFICE OF THE ENGINEER COMMISSIONER
OF THE DISTRICT OF COLUMBIA,
Washington, D. C., October 10, 1919.

SIR: I have the honor to transmit herewith annual reports giving in detail the operations during the fiscal year ended June 30, 1919, of the various divisions and offices under my supervision since March 10, 1919, I having taken over on that date certain of the duties previously assigned to Col. J. J. Loving, assistant to the Engineer Commissioner.

Very respectfully,

CAREY H. BROWN,
Captain, Engineers, United States Army,
Assistant to the Engineer Commissioner.

To the ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT.

SEPTEMBER 6, 1919.

SIR: The annual report of the water department for the fiscal year ended June 30, 1919, is herewith submitted:

The mean daily consumption for the year was 64,428,356 gallons, while for the year ended June 30, 1918, it was 59,606,970 gallons, showing an increase of practically 5,000,000 gallons per day for this year.

In my report for last year a method was outlined for an equitable arrangement for payment for water used and to prevent its waste by Government and District departments by charging said departments for all water used. Evidently this idea was not acceptable to Congress. When, however, it is brought to the attention of Congress that only 50 per cent of the water used in the District is paid for, it would appear to the fair-minded that Congress would not allow such a state of affairs to exist and would insist upon a plan whereby everyone who used water would pay for it, especially when it appears, from the best sources available, that the relative amounts invested in the construction of the water distribution system of the District of Columbia are as follows:

Paid by United States Government	$7,561,009.10
Paid by the District government	3,601,264.30
Paid by the water department	9,230,211.56
Total	20,392,484.96

The above statement shows that the United States is not the largest contributor to the construction end of the water system, and when it is further shown that Congress has appropriated from water department funds during the years 1917, 1918, and 1919 the sum of $537,600 for the upkeep of the Aqueduct and filtration plants (thereby taking this sum which was absolutely necessary for extension of trunk mains for our second and third high services) it will or should see that a more equitable arrangement is made for payment for water used by both the United States and District Governments. I am of the opinion that everyone who has to pay for water will take more interest in looking into and preventing its waste.

Water pumped.

Service.	Fiscal year 1918-19.	Fiscal year 1917-18.
	Gallons.	*Gallons.*
First high (city)	7,139,192,000	7,003,710,000
Second high (city)	3,195,881,990	2,836,902,870
Third high (city)	912,223,400	801,444,200
Fourth high (city)	98,682,115	108,272,624
First high (Anacostia)	118,688,400	126,615,300
Second high (Anacostia)	11,591,560	10,944,886

No estimate was submitted for the covering of Brightwood Reservoir, owing to the fact that if certain plans for increasing the water supply of the District of Columbia are carried out the elevation of the second high service lines will be changed. This change will possibly lead to the abandonment of this reservoir.

The total length of mains laid for this fiscal year is 47,688 feet, or 9.03 miles, making the length of mains in service 633.1 miles.

Reports of the divisions of this department, in detail, are herewith submitted.

Very little has been done during this year toward the completion of metering the water services of the District of Columbia owing to the high cost of meters and lack of funds. There were installed only 394 meters during the year. The percentage of metered services is 86.

I wish to record my appreciation of the work done by the employees of the department.

J. S. GARLAND,
Superintendent Water Department.

ASSISTANT TO THE ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION.

SIR: I respectfully submit the following report of work done by division "D," engineering, construction, plans, estimates, tests, telephone switchboard, and records for the fiscal year ended June 30, 1919:

Work was completed on the extension of a 24-inch trunk water main in Twenty-first Street NW., southward from L Street to territory west of Seventeenth and north of B Street NW., in which numerous frame buildings for United States Government purposes have been erected. This water main was necessary to improve the water service for fire and domestic purposes in the area affected.

A 12-inch water main was laid in Sixteenth Street and Alaska Avenue north from Military Road to better serve the territory north of Brightwood and the Walter Reed General Hospital, which have been supplied heretofore by a single line of 12-inch main.

In Missouri Avenue from Four-and-a-half Street to Sixth Street, a 20-inch main was laid for reinforcement and fire protection purposes for the new office buildings erected for the United States Government between B Street NW. and B Street SW. and between Four-and-a-half and Seventh Streets. This main is a direct connection between the 30-inch trunk main in Four-and-a-half Street and the 12-inch main in Sixth Street.

The laying of 12-inch water mains in Sixth and Seventh Streets between B Street north and B Street south and through the Smithsonian Grounds from Seventh to Ninth Streets were completed and put in service for fire and domestic purposes for new buildings erected by the United States Government in this section.

Due to the construction of a bridge over the railroad tracks at Benning Station to eliminate a grade crossing it was necessary to remove and re-lay on an offset line about 800 feet of 16-inch water main.

(For detailed report see reports of Messrs. Fitzgerald, Hebbard, Lay, Yates, Woodward, and chief operator of the pumping station.)

D. W. HOLTON, *Engineer.*

The SUPERINTENDENT OF THE WATER DEPARTMENT.

SIR: I respectfully report that the following work was completed during the fiscal year beginning July 1, 1918, and ending June 30, 1919:

Number of mains laid:		Number of mains laid—Contd.	
24-inch	2	4-inch	1
20-inch	2	2-inch	1
16-inch	2	1¼-inch	2
12-inch	13		
8-inch	64	Total	87

Mains laid in place of old:

24-inch (substitute for 6-inch) E Street, between Seventeenth and Eighteenth Streets NW.

20-inch (substitute for 8-inch) Twentieth Street, between New York and Virginia Avenues NW.

12-inch (substitute for 8-inch) Twentieth Street, between B Street and Virginia Avenue NW.

8-inch (substitute for 6-inch) Seventeenth Street, between Pennsylvania Avenue and H Street NW.

8-inch (substitute for 4-inch) D Street, west from Ninth Street SW.

8-inch (substitute for 6-inch) Ninth Street, north from Mount Vernon Place NW.

Mains lowered:

8-inch, Q Street, between Twenty-fifth and Twenty-sixth Streets SE.

8-inch, Park Place, east and west of Twenty-fifth Street SE.

8-inch, Twenty-fifth Street, south from Park Place SE.

6-inch, Thirteenth Street, between Franklin and Girard Streets NE.

8-inch, Kennedy Street, between First Place and First Street NW.

8-inch, Sixteenth Street, north from H Street SE.

6-inch, Woodley Road, east and west from Thirty-eighth Street NW.

6 and 8 inch, Thirty-eighth Street, north and south from Woodley Road NW.

8-inch, Concord Avenue, between New Hampshire Avenue and North Capitol Street NW.

Valves installed:		Valves removed and abandoned:	
24-inch, 2-way	2	12-inch, 2-way	2
20-inch, 2-way	3	8-inch, 2-way	9
16-inch, 2-way	2	6-inch, 2-way	16
12-inch, 2-way	20	4-inch, 2-way	30
8-inch, 2-way	112	3-inch, 2-way	4
6-inch, 2-way	58	2-inch, 2-way	1
4-inch, 2-way	47	6-inch, 3-stem	3
3-inch, 2-way	25	6-inch, 4-stem	3
2½-inch, 2-way	1	6-inch, 4-stem (8-inch bells)	1
2-inch, 2-way	19	4-inch, single stem	1
1½-inch, 2-way	2		
1¼-inch, 2-way	2	Total	70
6-inch, 3-stem	9		
6-inch, 3-stem (8-inch bells)	9		
6-inch, 4-stem	6		
6-inch, 4-stem (8-inch bells)	7		
Total	324		

Valve casings installed	253
Buffalo boxes installed	34
Valve casings removed	44
Buffalo boxes removed	6
Valve casings installed in place of old	8
Buffalo boxes adjusted	10
Valve casings adjusted	10
Valve casings installed in place of Buffalo boxes	5
Fire hydrants erected (new in place of old, 41)	111
Fire hydrants removed	49
Fire hydrants adjusted	14
Fire hydrants paved around	83
Street hydrants paved around	22

orse fountains paved around	4
aved cuts on account of leaks	18
ddded cuts on account of leaks	13
aved cuts over new mains	4
odded cuts over new mains	2
aved cuts over service pipes	2
umber of connections (3 to 6 inches) to buildings	36

MISCELLANEOUS.

Removed the 12-inch main (temporary) in Vista Street between Franklin treet and South Dakota Avenue NE.

Changed location of 6-inch meter at Corby's plant.

Offset 6-inch main over steam tunnel at Thirteenth and B Streets NW.

Lowered 6-inch main in front of No. 1770 Massachusetts Avenue NW.

Removed and replaced 16-inch main in Benning Road east and west of Kenilworth Avenue NE.

Repaired brick vault over 24-inch valve at Sixth and R Streets NW.

Repaired broken 24-inch main at Eleventh and S Streets NW.

Removed 8 by 4-inch tee and capped main at Nineteenth and B Streets NW.

Removed 20 by 6 inch saddle and valve from main in Fourteenth Street orth from B Street NW.

Changed location of post indicator valve in Twentieth Street between B and Streets NW.

Laid 2-inch service in Alabama Avenue, between Stanton Road and Thomas Street SE.

Laid 1¼-inch service in Jasper Road and T Street Hill SE.

Laid 2-inch service in Stanton Road west from Alabama Avenue SE.

JOHN E. FITZGERALD, *Foreman.*

To the SUPERINTENDENT WATER DEPARTMENT.

MISCELLANEOUS ENGINEERING.

SIR: I report that the following work was done for the fiscal year beginning July 1, 1918, and ending June 30, 1919:

urveys for—	
New mains (levels necessary on 69)	89
Lowering mains	9
Water department connections	4
Private connections	15
Meters and vaults	1
New location of old fire hydrant	2
New fire hydrant in place of old	41
New fire hydrant in new location	70
1-inch drains from old fire hydrants	1
Adjustments of fire hydrants	14
New valves	5
New public hydrants	2
New blow-offs	2
Preliminary surveys for water mains, etc	21
Preliminary levels for water mains, etc	75
Mains restaked	8
Investigations of pressure complaints	3
Fire hydrant elevations established	87
Fire hydrant pressures taken	96
Permits requested for fire hydrant drains	40
Notifications to sewer department for inspector for drain	40
Miscellaneous locations	43
Completed notes turned in	222
Visits to work in progress	698

Weekly charts of pressures were collected from four recording gauges during the spring and summer months.

Pressures were taken bimonthly on 45 fire hydrants scattered throughout the District.

New fire hydrant index cards were made for all new fire hydrants during the year.

The following gravity trunk mains were laid and put into service. The 24-inch mains in B Street between Seventeenth and Twenty-first Streets NW., Twenty-first Street between B Street and New York Avenue NW., and E Street between Seventeenth and Eighteenth Streets NW. The 20-inch mains in Twentieth Street between Virginia and New York Avenues NW. and Missouri Avenue between Four-and-a-half and Sixth Streets NW. The 16-inch main in B Street between Twenty-first and Twenty-third Streets NW. and the 12-inch main in Government Reservation between Seventh and Ninth Streets, and B Street NW., and B Street SW. These mains were made necessary on account of the erection of several new Government buildings in the above-mentioned territory.

The 16-inch main in Benning Road east from Anacostia Road NE. was removed and relaid in a new location in order that a new concrete viaduct might be constructed over the present railroad tracks.

The 12-inch third high service in Sixteenth Street between Military Road and Alaska Avenue NW. and in Alaska Avenue between Sixteenth and Elder Streets NW. was laid and put in service. This main was laid for the purpose of giving Walter Reed Hospital a sufficient amount of water. It also eliminates the isolation of Takoma Park, D. C., which heretofore had only one main supply.

The 12-inch third high service main in Van Ness Street west from Connecticut Avenue NW. was laid and put in service. This main was laid in order to supply the new Bureau of Standards building with water.

RALPH L. HEBBARD,
Assistant Engineer.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

SIR: I submit herewith the report of work done under my charge during the fiscal year ended June 30, 1919, as embodied in the reports of Mr. H. D. Yates, in charge of subdivision "tests and experiments" and Mr. H. M. Dante, in charge of subdivision, "plans, estimates, and miscellaneous drafting."

A. S. LAY, *Assistant Engineer.*

THE SUPERINTENDENT OF THE WATER DEPARTMENT.

MISCELLANEOUS DRAFTING.

Drawings and tracings made	62
Projects made	81
Files forwarded to assessor	81
Cards forwarded to assessor	129
Posting of maps and tracings	680
Valve notes posted on intersection cards	390
Communications, reports, etc., written	1,062
Permits passed	605
Intersection cards made	67
Locations of water mains given out	1,216
Water pressures given out	141
Connection cards for registrar	24

Posted, daily, 50, 100, and 300 foot scale water main maps, and map tracings; posted, daily, the work in progress; worked on cards showing mains, valves, etc., at street intersections; worked on valve index; passed schedules of work to be done under the commissioners' orders; passed schedules of work to be done by the surface division; passed permits for terraces, copings, and driveways; miscellaneous lettering, estimates, reports, and general office work.

H. M. DANTE, *Clerk in Charge.*

TO ASSISTANT ENGINEER, WATER DEPARTMENT.

TESTS AND EXPERIMENTS.

SIR: I submit the following report of the work done under my charge during the fiscal year ended June 30, 1919:

The subdivision of "tests and experiments" is charged with testing and correcting the measuring apparatus used by the department; with making accuracy

tests of all water meters to be used in the District of Columbia; with purifying the oil removed by the waste-cleaning machine; with collecting samples of coal deliveries; with making special tests of boilers and machinery as called for; with figuring the daily pumpage, consumption, station duty, etc., and with keeping necessary records.

Special tests made during the year include official duty trials of the 5,000,000 gallon De Laval centrifugal pumping unit installed in 1917, and accuracy tests on large-sized water meters by means of weir measurements. Although several changes have been made in the design of the pumping unit, the builders have not as yet been able to secure the guaranteed duty.

Miscellaneous tests made include the following: Water meters, ⅝ to 8 inch sizes, tests for accuracy, 11,863; valves, ¼ to 20 inch sizes, tests for leaks, 482; corporation cocks, ¾ to 2 inch sizes, tests for leaks, 682; curb cocks, ¾ to 1 inch sizes, tests for leaks, 504; fire hydrants, examined and tested, 5; and pressure gauges tested and corrected, 34. Also made tests of recording pressure gauges and thermometers; accuracy tests of automatic measuring tanks; accuracy tests of recording V-notch flow meters; set up recording pressure gauges on fire hydrants; tested and adjusted pressure regulator valves; repaired clock movements, and overhauled other testing and measuring apparatus installed in the pumping station.

The 1,500 ⅝-inch Worthington water meters furnished under contract during the year included 1,420 accepted "as received," and 80 rejected on account of inaccuracy. The inaccurate meters were repaired in the department's shops.

Tests of private and municipal water meters (excluding meters on endurance test) during the fiscal year ended June 30, 1919.

Meter.	Size, in inches.										Total.
	⅝	¾	1	1¼	1½	2	3	4	6	8	
American	18	2	8		1						29
Crown		1	3		2	4	5		2		17
Empire		13	4			2	2	3	1		25
Enarc		5	5	1	5	5					21
Gamon	2										2
Gem						5	4				9
Hersey	2,648	153	20		39	12	3				2,875
Keystone	745	15	4		3	2	3				772
King	14	1	1		5	2					23
Lambert	75	39	28		28	2	10	2			184
Nash	6	71	98		62	28	13	6	4		288
Niagara		38	30	10	21	22	1				122
Pittsburg	2	4	3		5	4	1				19
Standard					1						1
Thomson		6	1		6	2					15
Trident	111	16	27		15	1	5	5			180
Union			8		2				1	1	12
Worthington	7,182	26	11	7	18	7	10	8			7,269
Total	10,803	390	251	18	213	98	57	24	8	1	11,863

Cost of operating pumping engines at the District pumping station during the fiscal year ended June 30, 1919.

Operating expenses:		
Salaries—1 chief steam engineer; 3 steam engineers; 3 assistant steam engineers, 3 firemen; substitute engineers; substitute firemen; boiler cleaners; steam fitters; electrician; helpers, and laborers		$30,328.11
Coal—16,787,835 pounds bituminous coal at $6.36 per ton		47,665.43
Miscellaneous supplies		5,070.11
Repairs to pumps, engines, boilers, and electric generators:		
Per diem labor	$6,275.30	
Material expenses	5,188.82	
		11,464.12
Total cost of operation		94,527.77

Total pumpage for the year, without allowance for slip ... gallons	11,253,358,880
Greatest amount pumped in 1 day (Dec. 4) ... do	35,527,430
Least amount pumped in one day (Aug. 1) ... do	27,289,680
Average dynamic head against pumps, in feet	107.2
Duty $\frac{\text{Gallons pumped, etc.}}{\text{Total fuel consumed}}$	59,930,536
Total fuel consumed	
Cost of fuel, pumping 1,000,000 gallons 1 foot high ... cents	$3\frac{93}{100}$
Total operative cost of pumping 1,000,000 gallons 1 foot high ... cents—	$7\frac{84}{100}$
Total operative cost per 1,000 gallons pumped ... do	$\frac{84}{100}$

The above items of salaries, supplies, and repairs were furnished by the clerical division. The pumpage is figured from plunger displacement, without allowance for slip. The aggregate slip of all reciprocating pumps during the year, based on pitometer determinations, was 4.18 per cent. Venturi meter measurement was made of pumpage by the centrifugal pumping unit. The average dynamic head is figured from the total work done by pumping engines and generators. The fuel consumed is the total coal burned excluding the heating system. The cost of heating—431,070 pounds of coal—was $1,239.31.

During the year there were 1,300 gallons of oil removed from the material passed by the waste-cleaning machine and rendered fit for use in oil cups.

All of the coal burned at the pumping station during the year was bituminous coal, furnished by the United States Government. Samples were collected from each delivery which was usually a 300-ton lot, and sent to the Bureau of Mines, where tests were made. The analyses averaged 2.2 per cent moisture "as received" and 18 per cent volatile matter, 70.71 per cent fixed carbon, 1.37 per cent sulphur, 11.35 per cent ash, and 13,710 British thermal units per pound, on the dry-coal basis.

The total pumpage for the year at the District pumping station was 11,253,354,880 gallons, which is 605,194,880 gallons more than in 1917–18. The total operating expenses chargeable to pumpage was $94,527.77, as against $74,128.88 in 1917–18, making the total operative cost of pumping 1,000,000 gallons of water into the mains, $8.40. This is $1.49 per million gallons more than in 1917–18, and is due partly to the increased cost of labor and material, and partly to the falling off in station duty. The average cost of coal per ton for the year was $6.36.

The station duty for the year was 59,930,536 foot-pounds per 100 pounds of coal. This is 8.9 per cent less than the duty obtained during the preceding year, and represents an annual loss of approximately 875 gross tons of coal. This loss in duty may be attributed to a greater proportionate amount of work performed by the low-duty pumping units.

Reports submitted during the year include all special tests made, and the daily pumping station and water consumption reports.

The accompanying tabular statements show the sizes and makes of all private and municipal water meters tested during the year, and the operative cost of pumping.

The normal force employed, in addition to myself, consisted of two computers, one skilled laborer, one plumber, and one helper.

H. D. YATES, *Engineman.*

TO ASSISTANT ENGINEER, WATER DEPARTMENT.

Sir:

The following report of Division "D," Care and Maintenance of Valves, Care of Reservoirs and Tanks, Miscellaneous Plumbing, Inspection and Repairs to Fire Hydrants, Street Hydrants, Pumps and Fountains and Repairs to Leaks, for the fiscal year ended June 30, 1919, is respectfully submitted herewith:

Valves:	
Operated	4,305
Packed	105
Fitted with new keynuts	5
Examined for condition	235
Repaired	99
Inspected to check normal position	225

Valves—Continued.	
Capped	5
From which gates were removed	1
Installed (2½ inches)	1
Fitted with new brass stems in place of old—	
12-inch, 2-way	2
6-inch, 2-way	7
6-inch, 4-stem	1
6-inch, 3-way	3
4-inch, 2-way	1
3-inch, 2-way	1
Valve casings:	
Cleaned	4
Uncovered	204
Examined for number plates	1,175
Marked for number plates	92
In which number plates were installed	16
Examined for grade	1,128
Examined for condition	1
Valve casing covers installed in place of old	3
Air valves:	
Installed	6
Installed in place of old	2
Repaired	1
Blow-offs flushed	1,376
Indicator posts:	
Reset	24
Removed	2
Painted	248
Stenciled	235
Cleared of weeds	28
Erected	5
Recapped	10
ndicator post caps painted	397
ntersections located	235
'ire hydrants:	
Examined	34,420
Repaired	746
Lubricated	7,987
Flushed	214
Painted	49
Adjusted	1
Erected	1
Erected in place of old	1
Cleared of weeds	65
On which air valves were placed	90
Reversed	4
Pressures taken	16
Public hydrants:	
Erected	12
Erected in place of old	13
Examined	5,089
Repaired	283
Removed and abandoned	6
Thawed out	10
Cleared of ice	7
Flushed	10
Adjusted to grade	1
Horse fountains:	
Repaired	86
Cleaned	6,336
Examined for condition	2
Erected in place of old	3
Adjusted to grade	2
In which float valves were cleaned	81
Casings in horse fountains cleaned	29
Combination fountains repaired and reset	1

Pumps:	
Examined	1,556
Repaired	78
Erected in place of old	2
Removed	1
Painted	2
Removed and abandoned	1
Sanitary drinking fountains:	
Repaired	64
Cleaned	921
Adjusted	1
Erected in place of old	2
Traps cleaned	2,631
Miscellaneous inspections made	53
Standpipes removed from blow-offs	1
Curb boxes repaired	3
Brightwood Reservoir:	
South basin—	
Cleaned	1
Sprayed	1
North basin—	
Cleaned	1
Sprayed	1
Complaints:	
Unpalatable water	6
Low pressure	2
Water hammer	4
No water	3
Service pipes:	
Repaired	33
Laid	6
Reconnected	1
Abandoned	4
Changed from old to new mains	17
Thawed out	1
Drainpipes:	
Repaired	3
Laid	5
Cleaned	20
Mains:	
Examined	2
Capped	1
Fittings strapped to mains	10
Smith cuts made	14
Cut-offs made	61
Connections made on mains	10
Lead connections made	6
By-passes:	
Repaired	1
Removed	1
Springs cleaned	1
Fire alarms answered	2
Traps installed in place of old	1
Bleeders:	
Installed	3
Repaired	3
Examined	8

MISCELLANEOUS WORK.

Removed all angle valves from standpipes, drained and capped same for winter months, and replaced and turned on water for summer months at the Bryant Street pumping station, Anacostia pumping station, Brightwood and Reno reservoirs.

All valves equipped with hydraulic operators were operated once each month to keep them in good working order.

The field gauge was tested once each month.

lumbing was kept in repair in water department buildings, Camp Pleas-
d Camp Good Will.
ined fire hydrants and air valves once each week on main from Con-
eights to Blue Plains SW., to remove accumulated air from main.
hly examinations were made for leakage on closed valves controlling
to the Willard Hotel.
ily examinations were made of valves and check valves controlling the
to the Columbia Hospital to ascertain if they were in good working
id responsive to the varying water pressure.
tigated conditions relative to abnormal consumption of water at the
nent Hospital for the Insane in Congress Heights, Evening Star Build-
the Dunbar High School.
ined the fixtures for detection of waste of water in the Homer Building,
enth and G Streets NW., and in the Government buildings on B Street
Sixth and Seventh Streets NW., and on B Street between Eighteenth
ieteenth Streets NW.
cted for condition and normal position all divide valves and side stops
erritory bounded by W Street NW., Michigan Avenue NE., Second Street
id Tenth Street NE.
ed all bleeders on exposed mains for the winter months and closed same
summer months.
ed off water to various fixtures and buildings, drained boilers and pipes
ter months at Camp Good Will, Rock Creek Park, and turned on same
imer months.
permanent shift from the first high to the gravity service in all mains
i Seventeenth and Nineteenth Streets east and between B Street SE. and
t NE.
ed recording gauges and turned on water in the following locations:
Road and Jewett Street NW., Four-and-a-half and P Streets SW.,
-eighth and Douglas Streets NE., and First Street and Nichols
SE.
ed three-fourths-inch standpipe and self-closing spigot with 2-inch pipe
for use of military camp at west end of the Pennsylvania Avenue
SE.
ved bubble jets and flushed supply pipes of sanitary drinking fountains
ous locations.
ined all valve casings before and after completion of repairing and
cing of streets and where granolithic sidewalks were laid to see that
ere properly adjusted to grade and the proper number plates attached.
water towers in Randle Highlands, Good Hope, and Congress Heights
ispected monthly.

REPORT OF LEAKMEN'S WORK, DIVISION "D."

mains repaired (16 inches and larger)	11
mains repaired (3 to 12 inches)	35
repaired (16 inches and larger)	56
repaired (3 to 12 inches)	382
pipes found closed	53
pipes reported leaking and cut off at main	129
pipes reported leaking and cut off at meter	30
pipes reported leaking and cut off at box	251
pipes reported leaking and cut off inside house	21
pipes cut and plugged	3
pipes plugged	26
pipes abandoned	12
s where supply was turned on by request	119
eaks found in charge of plumbing	22
eferred to the water registrar	34
reported leaking	18
reported frozen	1
reported leaking, referred to the water registrar	44
reported choked	2
eported and found to be wrong number	19
reported leaking, referred to the health department	1
ted sewers, referred to the health department	38
ted sewers reported	23

Reported leaks found to be false	164
Reported leaks, could get no response from occupants	29
24-hour notices served	315
48-hour notices served	13
Valves reported broken	1
Valves reported leaking	21
Air valves reported broken	2
Air valves reported leaking	1
By-passes reported leaking	1
Bleeders reported leaking	1
Fire hydrants reported leaking	12
Fire hydrants reported broken	5
Horse fountains reported leaking	1
Horse fountains reported broken	3
Sanitary drinking fountains reported leaking	1
Public hydrants reported leaking	9
Public hydrants reported broken	1
Drains choked	1

Examined all exposed mains (28 locations) once each week for leakage.

Pumped out valve casings and vaults in various locations and pumped out 12 flooded cellars.

W. R. WOODWARD,
Chief Inspector of Valves.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

TELEPHONE SERVICE.

SIR: I respectfully submit the following report of work done by the telephone operators at the water department switchboard, during the year ended June 30, 1919.

A brief summary of the chief items of work done during the year is as follows:

Recorded—	
Leaks	3,984
Fire hydrants out of service	543
Fire hydrants in service	560
Cut-offs by water survey division	522
Fire alarms	1,173
Reservoir elevations	2,190
Gate house elevations	306
Engine counters, Anacostia	1,460
Engine counters, Reno	1,095
Leakmen's reports	9,423
New jobs	674
No-water complaints	109
Low-pressure complaints	33
Turn-on services	219
Issued work orders for repair of fire hydrants, etc	809
Issued morning reports of various job locations	3,286
Telephone connections	365,860

All records of leaks and movements of the leakmen are kept by the telephone operators at the department switchboard.

The daily morning report of the various job locations, construction, and repair gangs is compiled and typewritten by the telephone operators.

All records of broken valve covers, dangerous holes, etc., are handled by the telephone operators through the storeroom and stable. On Sundays and holidays this work is assigned to the leakmen for disposition.

New fire hydrants erected, and fire hydrants in place of old, are recorded by the telephone operators, and all information pertaining to same is transmitted to Chief Wagner's office, District of Columbia fire department.

Reports from various foremen, relative to underground exposure of properties of the public service corporations, during the year, were reported to the Public Utilities Commission, by the chief telephone operator.

telephone switchboard is connected by means of four lines with the peake & Potomac Telephone Co.; by one line with fire-alarm headquarters, ines with main 6,000, and 32 lines to various divisions and branches of the ment, reservoir, etc.

present force in the telephone room consists of a chief operator and two ne operators.

CONRAD REINHARD,
Chief Telephone Operator.

SUPERINTENDENT OF THE WATER DEPARTMENT.

DISTRICT PUMPING STATION.

ollowing is a summary of work done at the District Pumping Station the fiscal year beginning July 1, 1918, and ending June 30, 1919:

umped, figured from plunger displacement:

st high service	gallons	7,139,192,000
nd high service	do	3,195,886,990
rd high service	do	912,226,400
otal	do	11,247,305,390
rth high service	do	98,682,115
ned	tons	7,671.36
oil used	gallons	817.80
il used	do	1,603
oil used	do	1,017.75
sed	pounds	533.25
ed	do	887.25

gular force employed for the operation of the pumping engines, boilers liaries, cleaning of machinery, etc., is as follows:

	Steam engineers.	Assistant steam engineers.	Firemen.	Oilers.	Cleaners.	Laborers.
	4	3	3	4	4	
	4	3	3	4	4	4

e fourth high service, the water is pumped from the Reno reservoir—supplied by the third high service pumps—to an elevated tank, by gasoines and triplex pumps. This machinery is operated daily by the n in charge of the reservoir, and two assistants on night duty. The mped for this service during the year was, 98,682,117 gallons, or a 270,197.5 gallons daily.

nacostia pumping station has been operated without interruption he year, pumping to the three towers supplying the area east of the a River. This station is taken care of by four men.

ater pumped during the year, figured from plunger displacement,

	Gallons.
gh service	118,688,400
igh service	11,591,560
tal	130,279,960

n of 356,931.4 gallons daily.

REPAIR SHOPS.

ork accomplished during the year follows: All necessary repairs for y at the District pumping station, Reno and Anacostia stations; reautomobiles and trucks for this department and other departments istrict of Columbia; made practically all repair parts for fire plugs, treet hydrants, etc., including all tools used on the work of laying

water mains, etc., such as picks, chisels, breakers, calking tools, yarning irons, valve keys, pipe bands, eyebolts, arch irons, and miscellaneous tools and appliances as required for the various work.

The detail of the work follow, in part: Put lines in connecting rods and new joints in steam connections on No. 4 engine; repaired waste cleaning machine; made crank shafts for Dent fire plugs; made valve springs for pumps; ran pipe for heating system for garage in stable yard; put new tubes in No. 5 boiler; made repairs to coal crusher; bored out trunnion bearing for concrete mixer for surface department; repaired boiler and pipe in west garage; put up pipe rail around boiler pit at Reno; made repairs and changed piping on Holly return system; made new magneto coupling for air-compressor engine; repaired boiler furnaces and water softener; made repairs to flywheels of No. 1 engine at Reno station; made gate post for Brightwood Lodge; repaired pipe on boiler feed supply; made tire carrier for auto; put on band and braced No. 4 pump chamber; made new lathe center; made repairs to pump and gas engine for superintendent of bridges; put Venturi meter tube in feed line in boiler room; repaired turbine tube cleaner; cut nipples for storekeeper; made brass castings for valves, National Research Council, electrical department, Bureau of Standards, fire department, street-cleaning department, sewer department, District of Columbia repair shop, etc.; made aluminum signs for electrical department, and aluminum castings for Bureau of Standards; repaired 3,617 water meters and 62 valves; built and tested 229 valves and 25 street hydrants.

BRASS FOUNDRY.

During the year all composition metal castings for valve work, repair parts, etc., have been made in our foundry. There were made in the foundry 9,457 pounds of brass castings, small and medium size, such as would be made in a general jobbing shop. The showing of the foundry for the year has been very satisfactory, and the repair work at this station has been much expedited by the casting of repair parts when needed for emergency. Attention is invited to the annual report of the foundry.

BLACKSMITHING.

The blacksmiths have forged bolts for engines; made S hooks for fire plugs; repaired tools; made pipe bands, feather wedges, T bolts, irons for coal-crusher hopper, new diamond-point chisels, lifting chisels, flogging chisels, flat chisels. Made iron hangers for superintendent of parkings. Sharpened 3,784 chisels, 6,615 picks, 211 steel bars, 32 frost pins, and made 12 frost pins. Repaired 293 stakes; dressed 45 calking sets; and welded 610 new ends on picks.

CARPENTRY.

Built areaway to cellar at Reno Lodge, and door for same. Repaired field boxes for water survey division; repaired body on 2½-ton truck; made doors for stable, shed, and garage; built garage in stable yard. Repaired body on 5-ton truck. Sharpened saws for storekeeper; cut hole through basement wall for heating conduit for stable yards. Made tool box for transit box; repaired 5-ton platform scales; made storm sash for Reno; made new top for Lippard auto; repaired doors in leakmen's shelter; made file rack for water survey division; made forms for concrete covers; made drawing board for water survey division, and card cases for meter cards. Repaired doors in station. Changed counter in office at District building. Made screens for Anacostia station; repaired floor in greenhouse. Built pattern rack in loft. Put body on Wilcox leak truck. Made tool rack for meter room. Inspected buildings at Anacostia, Reno, and Brightwood. Made 396 8-inch concrete rings, 228 4-inch concrete rings, 198 8-inch sectional rings, 54 24-inch covers, 21 36-inch covers, 112 8-inch cylinders, 7 8-inch reducing rings, and filled and roughed 314 casing covers.

PAINTING.

The painters have painted walls, ceilings, and woodwork at Brightwood Lodge; painted storm wagons and wheels for police patrol. Repaired cushions for leak trucks; painted pitometer boxes; covered drum heads on No. 7 boiler; repaired asbestos covering on boilers; painted greenhouse; painted woodwork of stable, street hydrants; painted and stained floors inside of

Reno Lodge, walls, and woodwork; lettered new auto trucks and motorcycle; covered top of auto ambulance; painted crane at Anacostia. Inspected tower and pipe at Bridgtwood Reservoir. Glazed and painted storm sash at Reno; stained and finished cabinet for water survey division; cleaned and painted boats for Brightwood Reservoir. Cleaned and painted window frames and woodwork in District pumping station. Painted apartment over repair shop. Stained and varnished counter in office at District Building. Painted gutters and downspouts on stable and blacksmith shop.

ELECTRICAL WORK.

The electrician and helper have taken care of generators, switchboards, motors, lights, etc.; operated conveyor, economizer, and crane; tested and recharged storage batteries; repaired electric fans and lighting systems on various automobiles; cleaned ejector in coal crusher; repaired cable and lights on No. 7 engine; repaired lights in vault at Fourth and Bryant Streets; repaired engine stop on No. 4 engine; adjusted blueprinting machine; drilled buckets and made repairs to conveyor. Set up pump for superintendent of parkings. Ran wires and connected call bells for water survey division. Ran conduit and made connections for motors on machine tools for superintendent of parkings.

CARE OF STATION.

The janitor's force has taken care of all cleaning throughout the building; removing shavings from the wood-working shop; attended to window cleaning, removing turnings, scrap, and other material from machine shop; furnished service to the office, etc.

JAS. T. FINK,
Master Mechanic.

THE SUPERINTENDENT OF THE WATER DEPARTMENT.

WATER SURVEYS.

SIR: I have the honor to submit herewith the annual report of the operations of the division of water survey for fiscal year ended June 30, 1919.

Leakage and waste of water in the District of Columbia are increasing rapidly. Present high consumption is not due entirely to increased population. Millions of gallons daily can be saved by proper preventative measures which the department has the power to inaugurate at once. During the past year 1,160,000 gallons daily underground leakage was detected and stopped by this division in spite of the most inefficient conditions. Leakage of over 6,000 gallons daily per mile of main surveyed represents what was found by detailed surveys during the year. Thousands of gallons leakage per day was stopped merely by the most superficial examinations in sections which could not be given close scrutiny. The total leakage found might easily have been doubled or even trebled by slightly increased operative force in this division and ample transportation facilities. For years the work of this division has consistently resulted in reduced total consumption, reduced per capita consumption and reduced percentage of night flow. Last year due to curtailment of working force and lack of proper transportation facilities the work was seriously handicapped. Maps, records, tabulations, and matters of every description which are necessary for the efficient prosecution of water survey work have been neglected to such an extent that it will take several years to restore normal conditions even though proper organization were established at once. With the menace of water shortage ever present and the efficacy of the water surveys proved by past accomplishments steps should be taken at once to place this division in shape by filling the gaps in its organization and increasing transportation facilities to meet the situation. A schedule of wages should be adopted at once to permit the securing and retention of capable water-waste engineers to carry out an intensive drive against leakage and wasteful practices. During the past year usage of water even through meters was curtailed by orders of the commissioners, thereby reducing materially the revenue of the department. The State of Maryland is ready to receive

and pay for whatever water the District of Columbia can spare. No definite plans are yet made for an enlargement of the supply system. Certainly the facilities at hand for preventing leakage and waste, known to be millions of gallons, should be utilized to the fullest extent.

Statements of the work of this division are submitted as supplement to this report. They give in detailed tabulated form all data of value. The most significant points of interest are obvious but brief reference is made here to them.

The total underground leakage found and prevented was 1,160,000 gallons daily or over 300,000 gallons daily greater than found during the previous year in spite of the fact that the work was confined to smaller area. The average main leakage per mile found last year of 6,120 gallons daily shown on statement No. 3, compared with previous corresponding figures is significant of conditions generally throughout the city. Reference to statement No. 1 shows that a much greater number of leaking service pipes was discovered considering the relatively limited territory and that the average waste per leak was considerably higher than found at any time since 1912. These facts are significant and also indicative of conditions throughout the city. Inspection of fixtures in unmetered houses was limited during the year by the fact that work was done in sections which were practically 100 per cent metered. The somewhat low percentage of houses found with defective fixtures as shown on statement No. 4 is not fairly indicative of true conditions, due to the limited number of examinations. Measurements of flow into permanent districts as shown on statement No. 5 give further indication of the growth of leakage in the city. Percentages of night rate are too high, especially so in view of the recent heavy increase in population. Surveys in districts K and L, as shown on statement No. 6, were incomplete in many details due to conditions over which this division has no control.

Special investigations were made during the year for various purposes. This work does not increase the total leakage found by this division but consumes a vast amount of time of the most valuable employees. The work, however, is of a necessary and important nature. Measurement of total flow was made at the sewerage pumping station to determine whether previous wasteful practices were again occurring. Conditions were found satisfactory.

Lack of pressure at the Boys' Reform School on Bladensburg Road involved this division in an investigation lasting several months. The purpose of this was to locate excessive intermittent peak loads on the supply system throughout the eastern section of the Brightwood service. The trouble was traced to the Corby's yeast factory at Langdon and partly to a penstock in the Baltimore & Ohio Railroad yards in Eckington. The trouble due to the latter was remedied by abandonment of the fixture upon our request to the Washington terminal manager. Closure of a 12-inch divide valve on Bladensburg Road between Corby's plant and the reform school practically remedied the conditions in so far as low pressures were concerned at the latter place and at other high points in the vicinity, but caused a low pressure condition in the Corby plant. Complete survey in detail of the water usage in this plant and a general revision of meter and water distribution systems were found to be necessary to permit the plant to continue in operation. This work was performed under the direct supervision and according to plans devised by this division. The results have been entirely satisfactory and no complaints of any nature have been received since completion.

Investigation of water usage in ice and refrigerating plants at the United States Soldiers' Home was made and recommendation submitted, upon request, as to our opinion of the best method to permit the reuse of the cooling water.

Complete inspection of all fixtures in school buildings throughout the city resulted in the detection of a great waste of water, particularly during the hours when the buildings are closed at night. Recommendation was made to the superintendent to refer this matter directly to the school authorities.

Complete inspection and flow tests were made at Walter Reed Hospital resulting in the submission of an itemized list of 130 leaking fixtures to the Quartermaster Corps. Officials in charge have promised immediate repairs.

The total cost of running the water survey division for the year was $33,462.25. This was abnormally high as compared to previous costs and results. This was due to the increased cost of labor, disorganization of force, and lack of transportation facilities. The water saved alone, ignoring other valuable work accomplished, represents an annual return upon the investment

of 67 per cent. Cooperation and thorough work on the part of the employees made this result possible.

Very respectfully submitted.

PAUL LANHAM,
In Charge Water Survey.

The SUPERINTENDENT WATER DEPARTMENT.

SUPPLEMENTS.

Statement No. 1. Underground leaks, 1907–1919.
Statement No. 2. Year's results, 1919.
Statement No. 3. Sources and quantities of underground leakage, 1907–1919.
Statement No. 4. Results, house inspection, unmetered, 1907–1919.
Statement No. 5. Measurements of permanent districts, 1919.
Statement No. 6. Survey of permanent districts.
A. District "K," first high.
B. District "L," first high.

STATEMENT No. 1.—*Underground leaks, 1907–1919.*

Year.	Number.	Quantity (gallons per day).	Average (gallons per day).	Year.	Number.	Quantity (gallons per day).	Average (gallons per day).
1907–8	271	5,604,400	20,700	1914–15	385	1,828,820	4,800
1908–9	832	9,560,600	11,500	1915–16	420	1,981,600	4,700
1909–10	532	6,364,200	12,000	1916–17	340	1,752,750	5,155
1910–11	624	6,921,900	11,100	1917–18	178	834,640	4,689
1911–12	813	5,115,300	6,300	1918–19	180	1,160,510	6,447
1912–13	561	4,195,100	5,400				
1913–14	452	2,552,800	5,600	12 years		43,872,620	7,851

STATEMENT No. 2.—*Year's results, 1918–19.*

Service pipes inspected:	
Metered	26,138
Unmetered	15,080
Houses inspected, unmetered	1,062
Houses with defective fixtures	62
Number of notices served	75
Number of service cut off	22

Underground leakage.

Class.	Number.	Gallons per day.	Class.	Number.	Gallons per day.
Abandoned services, taps, etc.	1	8,000	Stopcocks	1	3,500
Iron services	39	325,900	Joints on mains	41	406,800
Lead services	18	147,000	Valves	1	3,200
Wiped joints	21	118,100			
Services, metered	43	99,360	Total	180	1,160,510
Couplings	15	48,650			

BLUE PRINTS.

Blue prints made for Division E	365
Blue prints made for Division B	96

EXPENSES.

Operating: Per diem labor and material	$27,583.53
New work: Per diem labor and material	5,878.72
Total	33,462.25

STATEMENT No. 3.—*Sources and quantities of underground leakage, 1907–1919.*

Class.	1907–8	1908–9	1909–10	1910–11	1911–12	1912–13	1913–14
SERVICES.							
	Galls. daily.	*Galls. daily.*	*Galls. daily.*	*Galls. daily.*	*Galls. daily.*	*Galls. daily.*	*Galls. daily.*
Abandoned taps and services	.....	.....	355,300	173,600	174,200	180,900	101,700
Iron services	2,729,000	5,214,000	2,438,000	1,508,900	2,329,800	1,988,800	924,000
Lead services			1,201,900	1,237,600	976,700	394,000	471,000
Wiped joints	327,000		710,100	666,700	438,100	282,300	237,000
Couplings	.....		118,700	182,900	123,700	75,600	86,900
Stopcocks	.....		84,800	43,300	53,500	32,900	16,900
Street washers	.....		.....	42,000	10,400	5,700	500
Public hydrants	.....	.....	.....	84,200	50,200	21,000	12,000
Unclassified	111,000	2,039,500	.....	97,600	103,800	15,000	56,500
Total gallons	3,167,000	7,253,500	4,908,800	4,036,800	4,260,400	2,996,200	1,886,500
MAINS.							
Joints on mains	1,039,500	1,345,600	1,034,200	2,562,500	746,300	962,300	596,800
Broken mains	1,200,000	117,000	332,000	15,900	7,000	103,300	62,200
Valves	23,500	62,000	89,100	110,900	27,100	13,200	6,800
Blow-offs	.....	737,000	.....	176,600	71,300	6,000	.....
Fire hydrants	174,000	45,500	.....	19,200	3,500	115,000	500
Total gallons	2,437,400	2,307,100	1,455,300	2,885,100	855,200	1,199,800	666,300
Total miles	.....	.....	62	192	194	292	298
Average per mile	.....	.....	23,473	15,027	4,408	4,109	2,236
Grand total	5,604,400	9,560,600	6,364,100	6,921,900	5,115,600	4,196,000	2,552,800

Class.	1914–15	1915–16	1916–17	1917–18	1918–19
SERVICES.					
	Galls. daily.	*Galls. daily.*	*Galls. daily.*	*Galls. daily.*	*Galls. daily.*
Abandoned taps and services	54,700	68,700	124,400	64,540	8,000
Iron services	861,950	449,440	759,600	298,700	325,900
Lead services	254,100	201,380	143,900	44,000	147,000
Wiped joints	213,500	342,480	128,890	96,300	118,100
Couplings	20,500	115,450	126,880	35,700	48,650
Stopcocks	17,150	28,700	26,800	4,600	3,500
Street washers	.....	.....	.....	.....	.....
Public hydrants	500	.....	.....	.....	.....
Unclassified	32,200	.....	168,780	.....	99,360
Total gallons	1,454,600	1,206,150	1,479,250	543,840	750,510
MAINS.					
Joints on mains	368,800	607,350	130,500	267,300	406,800
Broken mains	.....	142,800	115,000	18,000	.....
Valves	300	3,300	13,000	5,500	3,200
Total gallons	374,220	775,450	273,500	290,800	410,000
Total miles	113	183	151.5	108	67
Average per mile	3,320	4,237	1,800	2,700	6,120
Grand total	1,828,820	1,981,600	1,752,750	834,640	1,160,510

STATEMENT No. 4.—*Results, house inspection, 1907–1919, unmetered.*

Year.	Houses inspected.	Houses with defective fixtures.	Percentage.	Year.	Houses inspected.	Houses with defective. fixtures.	Percentage.
1907–08	(1)	(1)	(1)	1913–14	17,039	1,603	9.4
1908–09	27,758	4,621	16.6	1914–15	17,563	1,691	9.6
1909–10	21,642	3,305	15.2	1915–16	6,191	480	7.8
1910–11	21,547	3,262	15.1	1916–17	9,977	904	9.0
1911–12	31,289	4,943	15.7	1917–18	3,897	447	11.2
1912–13	26,397	3,725	14.1	1918–19	1,062	62	5.8

[1] No record.

STATEMENT No. 5.—*Measurement of permanent districts, 1918–19.*

District.	Boundaries.	Date.	Consumption.	Night rate.	Per cent.
A	From New Jersey Avenue to Fourteenth, B to L Streets, NW.	Aug. 15–22, 1918...	10,485,900	.....	.....
E	From Fourteenth to Rock Creek, River to P Street NW.	Sept. 18–24, 1918...	9,321,400	7,263,700	78
F	From New Jersey Avenue NW. to Eastern Branch, E to Florida Avenue NE.	Mar. 3–10, 1919....	10,530,200	6,681,900	63
G	From E Street NE. to E Street SE., First to Eastern Branch.	June 19–26, 1919...	4,004,200	2,268,800	57
nd K	From Eleventh to District line west, Pennsylvania Avenue to Florida Avenue NW.	July 1–7, 1919.....	8,416,900	6,214,700	74

STATEMENT No. 6A.—*Pitometer district K, survey No. 5.*

ate of measurement, ...
lean daily supply, ...
linimum night rate, ...
latio of minimum night rate to mean daily supply, ...
ubdivision survey:
Started, May 18, 1918.
Finished, June 13, 1919.
opulation:

Resident—	
Metered	(1)
Unmetered	(1)
Total	(1)
Floating—	
Metered	(1)
Unmetered	(1)
Total	(1)
Per capita consumption, computed from resident population	(1)
Buildings:	
Dwellings—	
Metered	8,706
Unmetered	124
Hotels and apartments—	
Metered	107
Unmetered	0
Municipal buildings—	
Metered	10
Unmetered	0
Federal buildings—	
Metered	4
Unmetered	0
Factories—	
Metered	0
Unmetered	0
Restaurants—	
Metered	0
Unmetered	0
Miscellaneous—	
Metered	759
Unmetered	29
Total—	
Metered	4,586
Unmetered	153

[1] No figures.

Night flow detected by subdivision	gallons per day	1,642,500
Due to inside flow—		
Metered	do	1,391,600
Unmetered	do	5,400
Due to underground leakage—		
Service pipes	do	129,700
Joints on mains	do	76,300
Valves	do	3,500
Total	do	209,500
Due to Federal buildings and fountains	do	0
Due to municipal buildings, flush basins, horse founts	do	4,200
Total flow accounted for	do	1,606,500
Total flow unaccounted for	do	36,000
Miles of mains		30

STATEMENT No. 6B.—*Pitometer district L, survey No. 5.*

Date of measurement, ...
Mean daily supply, ...
Minimum night rate, ...
Ratio of minimum night rate to mean daily supply, ...
Subdivision survey:
Started, Aug. 25, 1918.
Finished, Sept. 3, 1919.

Population:	
Resident—	
Metered	(1)
Unmetered	(1)
Total	(1)
Floating—	
Metered	(1)
Unmetered	(1)
Total	(1)
Per capita consumption, computed from resident population	(1)
Buildings:	
Dwellings—	
Metered	6,969
Unmetered	164
Hotels and apartments—	
Metered	34
Unmetered	0
Municipal buildings—	
Metered	16
Unmetered	0
Federal buildings—	
Metered	3
Unmetered	0
Factories—	
Metered	5
Unmetered	0
Restaurants—	
Metered	0
Unmetered	0
Miscellaneous—	
Metered	653
Unmetered	40
Total—	
Metered	7,407
Unmetered	204

[1] No figures.

Night flow detected by subdivision	gallons per day	1,455,000
Due to inside flow—		
Metered	do	728,100
Unmetered	do	21,000
Due to underground leakage—		
Service pipes	do	389,300
Joints on mains	do	231,500
Valves	do	24,400
Total	do	645,200
Due to Federal buildings and fountains	do	0
Due to municipal buildings, flush basins, horse founts	do	5,400
Total flow accounted for	do	1,399,700
Total flow unaccounted for	do	55,300
Miles of mains		37

Accounts and Stores.

Sir: The following is a summary of the work done during the fiscal year ended June 30, 1919, by the division of accounts and stores.

The expense account, and other tables herewith, show in detail the cost of operating the department; and the following statement shows the volume of miscellaneous office work done:

Vouchers passed	2,299
Requisitions made	636
Letters mailed	679
Official letters written	551
Work orders issued	1,192
Files received and forwarded	1,131
Pay rolls made	1,355
Miscellaneous papers handled	60,129
Letters filed	1,633
Transfer vouchers made	292
Records made on cards	1,946
	71,843

In the storekeeping branch the duties and responsibilities of Mr. W. V. Robertson, inspector in charge, were increased by placing under his direction the whole transportation of the department. The following is quoted from his report and shows that the increased duties imposed upon him have been discharged in an economical and efficient administration of the business of his important branch of this Division.

STOREKEEPING.

The cost of operating the storekeeping branch for the year was 3.72 per cent of the value of material issued and equipment disposed of. The cost of operating this branch for the past five years has been as follows:

	Per cent.
1915	4.676
1916	4.64
1917	3.91
1918	3.13
1919	3.72

The values of material and equipment received and issued during the year were as follows:

Year.	Material.		Equipment.	
	Receipts.	Issues.	Receipts.	Issues.
1919	$348,282.99	$338,328.15	$22,801.59	$16,853.94

[1] No figures.

The following table shows these values for the past five years:

Year.	Material.		Equipment.	
	Receipts.	Issues.	Receipts.	Issues.
1915	$244,152.74	$264,838.36	$170,140.38	$1,915.94
1916	255,174.17	254,945.05	23,461.60	30,379.82
1917	340,157.19	331,880.02	10,732.97	4,748.69
1918	380,113.88	321,578.56	42,414.29	5,439.46
1919	348,282.99	338,328.15	22,804.59	16,853.94

The value of material on hand at close of the year was $218,446.61, and the value of equipment in stock and in service at close of the year was $695,150.42.

TRANSPORTATION.

Hauled for use by construction forces and for storage in the property yards the following material:

49 tons of 48-inch cast-iron pipe.
7 tons of 36-inch cast-iron pipe.
418 tons of 24-inch cast-iron pipe.
84 tons of 20-inch cast-iron pipe.
277 tons of 16-inch cast-iron pipe.
927 tons of 12-inch cast-iron pipe.
911 tons of 8-inch cast-iron pipe.
60 tons of 6-inch cast-iron pipe.
30 tons of 4-inch cast-iron pipe.
26 tons of 3-inch cast-iron pipe.
120 tons of miscellaneous cast-iron fittings.
1 ton of 48-inch cast-iron fittings.
7 tons of 36-inch cast-iron fittings.
2 tons of 30-inch cast-iron fittings.
19 tons of 20-inch cast-iron fittings.
23 tons of 16-inch cast-iron fittings.
45 tons of 12-inch cast-iron fittings.
112 tons of 8-inch cast-iron fittings.
50 tons of 6-inch cast-iron fittings.
17 tons of 4-inch cast-iron fittings.
9 tons of 3-inch cast-iron fittings.
87 lengths of 24-inch T. C. pipe.
360 lengths of 15-inch T. C. pipe.
57 cubic yards of gravel.
71 cubic yards of sand.
101 barrels of Portland cement.
36,000 brick.
618 tons of soft coal.
13 tons of coke.
110 tons of pig lead.
82 tons of fire hydrants.
623 tons of miscellaneous material.

I again record my appreciation of the cooperation the employees of this division have given each other in the performance of their duties, and the loyal support they have given their chief.

SAM'L RIGGS,
Clerk in Charge of Accounting Division.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

ABLE I.—*Statement of cash account of the water fund, District of Columbia, including appropriations and outstanding obligations, for the fiscal year ended June 30, 1919, as shown by the books of the auditor, District of Columbia.*

alances July 1, 1918:		
Cash in Treasury of the United States	$192,098.14	
Cash in hands of collector of taxes, District of Columbia	308.67	
Cash in hands of disbursing officer, District of Columbia	7,373.92	
		$199,780.73
eceipts for the year:		
Water rents	782,159.36	
Taps and stopcocks	4,810.28	
Water main assessments	25,794.88	
Interest	2,384.55	
Sale of old material	1,482.58	
		816,631.65
epayments for year, including credit transfers		128,498.66
mount transferred from appropriation emergency fund, Washington Aqueduct, by United States Treasury		833.33
		1,145,744.37
Expenditures for year:		
Appropriations, water department, District of Columbia, 1919—		
Salaries—		
Revenue and inspection branch	37,076.30	
Distribution branch	43,857.25	
Contingent expenses	3,947.68	
General expenses	34,560.98	
High service	441,892.23	
Refunds	1,976.49	
		563,310.93
Appropriation, water department, District of Columbia, 1918—		
Salaries, distribution branch	36.67	
Contingent expenses	873.65	
High service	45,316.05	
General expenses	17,086.54	
		63,312.91
Appropriation, water department, District of Columbia, 1917—		
General expenses	26.70	
High service	12,067.82	
		12,094.52
Increase of compensation, water department, District of Columbia, 1919		37,830.63
Total water department expenditures		676,548.99
Advances account appropriations for—		
Washington Aqueduct, District of Columbia, 1919	212,000.00	
Increase of compensation, Washington Aqueduct, 1919	10,600.00	
Washington Aqueduct, District of Columbia, 1918	25,032.48	
Emergency fund, Washington Aqueduct, District of Columbia, 1918	3,915.55	
		251,548.03
		928,097.02

Balances June 30, 1919:			
Cash in Treasury of the United States		$162,725.53	
Cash in hands of collector of taxes, District of Columbia		3,223.83	
Cash to credit of disbursing officer, District of Columbia		51,697.99	
			$217,647.35
			1,145,744.37
Balance in water fund, as stated above			217,647.35
Less obligations against appropriations—			
Water department, District of Columbia, 1918:			
Contingent expenses	$9.10		
General expenses	491.90		
High service	39,428.92		
		39,929.92	
Water department, District of Columbia, 1919:			
Contingent expenses	194.03		
General expenses	4,356.22		
High service	42,696.69		
		47,246.94	
			87,176.86
Unobligated balance, water fund, June 30, 1919			130,470.49

TABLE II.—*Cost of work done by the water department for the year ended June 30, 1919.*

Heads of expenditure.	Per diem and salaries.	Material expended, cuts, and transportation.	Total expenditures.	Charged to general account.		Stable accounts, Dr.
				Maintenance.	Extensions.	
Water surveys (detection of leaks)	$27,583.53	$5,878.72	$33,462.25	$33,462.25		
Installation and maintenance of meters	24,133.64	18,270.47	42,404.11	23,853.38	$18,550.73	
Office of water registrar	58,274.88	6,435.30	64,710.18	64,710.18		
Inspection and repair of services	31,924.98	6,664.88	38,589.86	38,589.86		
Tapping water mains	2,776.99	1,202.13	3,979.12		3,979.12	
New services installed	414.72	2,441.31	2,856.03		2,856.03	
Engineering (field surveys)	21,204.87	1,097.44	22,302.31	5,664.79	16,637.52	
Stable account	17,952.57	6,200.52	24,153.09			$24,153.09
Operation and repair, valves, fire hydrants, etc	20,974.77	4,147.43	25,122.20	25,122.20		
New street hydrants and fountains erected	437.61	517.06	954.67		954.67	
Water mains laid	21,833.63	59,552.55	81,386.18		81,386.18	
Repairs to leaks	19,319.44	8,075.28	27,394.72	27,394.72		
Maintenance of reservoirs, lodges, and towers	2,425.84	1,117.86	3,543.70	3,543.70		
Care of grounds	6,818.23	234.00	7,052.23	7,052.23		
Repayment and special appropriation work	51,710.85	71,684.36	123,395.21		123,395.21	
Replacement work, lowering mains, etc	6,025.19	11,516.84	17,542.03	17,542.03		
Plans, estimates and tests	12,656.94	47.75	12,704.69	12,704.69		
Care of Bryant Street, pumping station	15,070.33	3,209.33	18,279.66	18,279.66		
Operation and repair, pumps, Bryant Street station	47,381.14	64,741.51	112,122.65	112,122.65		
Operation and repair, pumps, Reno station	4,639.36	2,241.32	6,880.68	6,880.68		
Operation and repair, pumps, Anacostia station	6,808.58	1,961.67	8,770.25	8,770.25		
Shopwork	19,166.18	12,721.84	31,888.02	16,663.87	15,224.15	
New building	1,219.95	875.32	2,095.27		2,095.27	
Furnished other District of Columbia offices	4,678.97	3,622.79	8,301.76	8,301.76		
Gross expenditures	425,433.19	294,457.68	719,890.87	430,658.90	265,078.88	24,153.09

TABLE II.—*Cost of work done by the water department for the year ended June 30, 1919*—Continued.

SUMMARY.

Expenditures:		Charged to—		Per cent.
Per diem pay rolls	$344,539.63	Maintenance	$430,658.90	61.9
Salary pay rolls	80,893.56	Extensions	265,078.88	38.1
Total services	425,433.19			
Material expended, cuts, etc	294,457.68			
Gross expenditures	719,890.87			
Less transportation credit	24,153.09			
Net expenditure	695,737.78	Net expenditure	695,737.78	100.0

TABLE III.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work.*

Diameter.	In service June 30, 1918.	Laid during year ended June 30, 1919.	Abandoned during year ended June 30, 1919.	In service June 30, 1919.
-inch ... linear feet	82,875	558	17	83,416
-inch ... do	154,386	662	59	154,989
-inch ... do	1,468,176	702	735	1,468,143
-inch ... do	874,717	22,551	204	897,064
0-inch ... do	9,107			9,107
2-inch ... do	381,593	12,401		393,994
6-inch ... do	23,665	1,423		25,088
0-inch ... do	113,036	1,028		114,064
4-inch ... do	26,408	8,358		34,766
0-inch ... do	57,995	5		58,000
8-inch ... do	59,437			59,437
2-inch ... do	23			23
3-inch ... do	44,172			44,172
5-inch ... do	600			600
Total	3,296,190	47,688	1,015	3,342,863
top valves	10,611	324	70	10,865
ire hydrants	3,548	112	50	3,610
ublic hydrants	227	12	6	233
anitary fountains	17			17
orse fountains	156			156
ublic wells (deep)	42			42
ublic wells (shallow)	4		1	3

TABLE IV.—*Statement of the length and cost of water mains laid from July 1, 1878, to June 30, 1919, paid from water department funds.*

Diameter.	In service June 30, 1918.	Laid during year ended June 30, 1919.	Abandoned during year ended June 30, 1919.	In service June 30, 1919.
inch ... linear feet	76,822			76,822
inch ... do	116,938	221	43	117,116
inch ... do	1,080,102	36		1,080,138
inch ... do	817,837	20,007	12	837,832
-inch ... do	6,739			6,739
-inch ... do	340,045	4,749		344,794
-inch ... do	17,940			17,940
-inch ... do	102,970			102,970
-inch ... do	14,494			14,494
-inch ... do	20,437			20,437
-inch ... do	38,248			38,248
-inch ... do	23			23
-inch ... do	14,309			14,309
Total	2,646,904	25,013	55	2,671,862

Total cost to June 30, 1918	$3,951,579.41
Total cost for year ended June 30, 1919	81,386.18
Aggregate cost to June 30, 1919	4,032,965.59

REPORT OF THE WATER REGISTRAR.

WASHINGTON, D. C., *September 6, 1919.*

SIR: I submit herewith the annual report of the revenue and inspection branch of the water department showing in detail the work accomplished during the fiscal year ended June 30, 1919.

INSTALLATION OF WATER METERS.

Owing to the increased cost of meters and material, as well as the scarcity of labor, the work of installation of water meters consisted only of metering services of new houses in some of those sections which had previously been metered.

The number of meters installed during the year was 394 and the number discontinued was 202, making the total now in use 61,299.

The following shows the average cost of installing a meter:

Meter	$7.75
Material	5.12
Labor	5.96
	18.83

LEAKS AND WASTES.

During the year 20,746 examinations for leaks were made. This included ordinary leaks at house fixtures and the more complicated cases of underground leaks, the detection of which required considerable time and the employment of experienced men.

In all, 71 water services were disconnected at the tap in the main.

The water supply was cut off from 747 houses this year during the period of vacancy, which has resulted in the saving of considerable water, and has prevented the reoccupying of the houses without the knowledge of the office, thereby insuring full payment for the time water was used.

During the year 125 taps and curb cocks were located.

SERVICE CONNECTIONS.

There were 555 new service connections made, inspected, and locations recorded during the year; also 707 repairs, etc., to water services and appurtenances were inspected and recorded.

This work was handled by the regular inspector with some assistance from the office force, and inspections have been made in the majority of cases within one hour of the time specified by the plumber doing the work.

Owing to the reduction in the number of new service connections, the tapper has been used in connection with leaks and wastes and the taking out and replacing of meters, thus keeping these branches of the work up to date. This detail did not occasion any loss of time in connection with the tapping of water mains, and saved the employment of more men in the subdivision to which the assistance was given.

REVENUES.

The table of comparative revenues shows a total collection of $926,469.02.

There has been an increase in the revenues from water rents this year, which is largely attributable to the small number of vacant houses and the increase in population, necessitating a larger use of water in metered premises.

Table 1 shows statement of collections and expenditures.

Table 2 shows comparative statement of revenues.

Table 3 shows number of meters in service.

Table 4 shows consumption of water in buildings owned or controlled by the District of Columbia.

Table 5 shows consumption of water in charitable institutions, hospitals, etc., which receive an allowance of free water.

Table 6 shows general information.

WATER RATES.

There has been no change in the water rates during the past year. The rate for domestic purposes is charged according to stories and front feet. On all tenements two stories high with a frontage of 16 feet or less, $5 per annum; for each additional front foot, or fraction thereof greater than one-half, 31 cents. For each additional story or part thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume of business, and water facilities, and rate from $1 to $25. If the flat rate on business establishments reaches $25 or more, the owner or occupant is required to install a water meter at his own expense.

Meter rates.—A minimum rate of $4.50 is charged against all consumers supplied with water through meters, which allows the use of 7,500 cubic feet of water during the fiscal year, water used in excess of this quantity being charged for at the rate of 4 cents per 100 cubic feet.

CONDITION OF THE WORK.

Notwithstanding the fact that there has been a large increase in business over that of previous years, owing to the growth of the population, the condition was met without any addition to the force and the work was up to date at the close of the year.

This result was obtained by the faithful cooperation of the employees, for which I now take pleasure in expressing my appreciation.

Very respectfully,

GEO. W. WALLACE, *Water Registrar.*

The SUPERINTENDENT WATER DEPARTMENT.

TABLE 1.—*Statement of collections.*

Water rents:	
Flat rate	$75,808.29
Meters	702,690.88
Building purposes	3,660.19
Total	782,159.36
Water main tax, principal and interest	28,179.43
Taps and stopcocks	4,810.28
Miscellaneous receipts	1,482.58
Total	34,472.29
Total receipts	816,631.65
Repayment, deposits, and special appropriations	109,837.37
Total receipts and repayments	926,469.02

TABLE 2.—*Statement of cash receipts and expenditures of the water fund, District of Columbia, for the fiscal years from June 30, 1903, to June 30, 1919.*

Year.	Water rents.	Water-main tax, principal and interest on same.	Taps and stopcocks.	Miscellaneous receipts.	Repayments, deposits, and special appropriations.	Total receipts and repayments balance brought forward.
1903						$341,337.37
1904	$341,947.53	$51,713.64	$6,522.67	$865.26	$16,074.20	417,123.30
1905	352,156.93	32,217.84	8,633.80	2,819.95	27,652.46	423,450.98
1906	362,266.54	34,395.76	9,100.00	23.60	25,187.61	430,873.51
1907	468,889.47	51,319.62	9,487.10	6,254.73	19,912.51	555,863.43
1908	479,981.22	57,462.39	8,688.10	1,376.24	47,984.45	595,492.40
1909	502,894.45	57,654.06	10,674.15	1,530.08	49,875.59	622,628.33
1910	509,769.23	70,905.15	11,744.78	1,715.20	26,498.58	626,682.94
1911	521,581.78	101,987.53	8,824.35	930.04	94,520.49	727,974.19
1912	545,405.47	122,458.81	11,438.65	2,817.50	110,441.39	792,561.82
1913	640,008.64	138,693.57	8,685.50	3,153.81	14,923.91	805,465.61
1914	646,296.15	83,379.21	6,118.20	4,253.20	24,131.64	767,178.40
1915	638,881.89	66,107.56	6,559.89	3,532.77	14,513.50	729,575.61
1916	624,882.18	64,647.80	7,920.80	1,761.39	24,669.76	722,981.93
1917	636,664.31	61,990.43	5,484.62	2,019.58	25,551.56	731,710.50
1918	714,388.28	34,649.46	3,705.65	458.96	44,391.59	797,593.94
1919	782,159.36	28,179.43	4,810.28	1,482.58	109,837.37	926,469.02
Total	8,768,153.43	1,066,762.44	127,518.54	35,024.89	676,166.61	11,014,963.28
1920 [1]	778,000.00	30,000.00	3,000.00	500.00		[2] 811,500.00
1921 [1]	772,000.00	30,000.00	3,000.00	500.00		[2] 805,500.00

[1] *Estimated.* [2] Estimated total revenue.

TABLE 3.—*Water meters in use June 30, 1919.*

Name.	⅝-inch.	¾-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.	8-inch.	Total.
American	161	2	14	4	2					183
American, new model	73									73
Crown	1	10	30	24	10	8		2		85
Empire	39	14	4	2	4	2	1	1		67
Enare		20	28	42	18					108
Eureka						1	1			2
Gamon	31									31
Gem					21	15	8	1		45
Hersey disk		601	48	93	26	18	8			794
Hersey, model F	21,129									21,129
Hersey torrent					1	2	2			5
Hersey detector						6	6	9	3	24
Keystone, Pittsburgh		50	50	35	21	27	4			187
Keystone, model W	11,953									11,953
King	135		4	7	1					147
Lambert	944	177	117	111	65	33	7	1		1,455
Lambert special	409									409
Lambert glass lid	68									68
Nash	120	221	355	260	119	44	16			1,135
Niagara		72	87	114	64	7				344
Standard	1			3						4
Thomson	1	6	20	25	18	1	1			72
Trident disk	2,231	91	113	101	27	4				2,567
Trident crest					1	7	16	1		25
Trident compound						3	1			4
Union		1	6	2	1				1	11
Worthington	221	55	61	53	29	29	7			455
Worthington, model D	35									35
Worthington, model G (old)	75									75
Worthington, model G (new)	3,291									3,291
Worthington, model K	16,511									16,511
Total	57,429	1,320	937	876	428	207	78	15	4	61,294
Registers										5
Total meters and registers										61,299

TABLE 4.—*Showing consumption of water in buildings owned or controlled by the District of Columbia.*

	Annual consumption.	Premises.	Meters.
	Cubic feet.		
Schools and annexes	49,827,900	145	150
Fire-engine houses, etc.	2,261,800	37	37
Police stations	3,997,300	13	13
Playgrounds	1,156,700	6	6
Public-comfort stations	1,861,000	3	3
Stables	1,659,200	5	9
Workhouse grounds	583,400	7	7
Industrial schools	968,600	1	4
Miscellaneous	4,823,800	28	35
Total	67,139,700	245	264

TABLE 5.—*Premises which receive an allowance of free water.*

Premises.	Consumption.	Allowance.	Exceeded.	Paid.	Meters.	Premises.
	Cubic feet.	*Cubic feet.*				
Churches	3,410,900	6,127,455	15	$333.57	109	91
Homes	4,588,400	3,958,200	9	459.02	32	25
Hospitals	12,622,600	10,309,100	4	1,576.26	14	10
Neighborhood houses	55,500	658,700			4	3
Orphan asylums	2,080,900	1,802,340	2	34.00	12	6
Schools	2,287,000	7,502,100	1	188.12	14	12
Total	25,045,300	30,357,895	31	2,590.97	185	147

TABLE 6.—*General information.*

Average cost of installing a water meter by the department:	
Meter	$7.75
Material	5.12
Labor	5.96
Total	18.83
Cost of labor and material for maintenance of meters	20,518.26
Average cost per meter for maintenance	.33

Consumption of water through meters:		
District meters	cubic feet	626,400,000
District meters, municipal buildings	do	67,139,700
Private meters	do	787,111,500
Private meters in charitable institutions	do	25,045,300
Total		1,505,696,500

Meters in service.	In use June 30, 1918.	Installed, 1919.	Abandoned, 1919.	Total in use June 30, 1919.
District meters	57,825	335	125	58,035
District meters in municipal buildings	265	1	2	264
Private meters	2,835	55	75	2,815
Private meters in charitable institutions	182	3	.....	185
Total	61,107	394	202	61,299

Average cost of reading meters	$0.20
Average cost of computing and making bills	.18
Average payment for premises in which meters were installed	6.62
Average payment for flat-rate accounts	7.71
Difference	1.09

Revenue:		
For metered water—		
District of Columbia meters	$384,362.67	
Private meters	318,328.21	
		$702,690.88
For flat-rate accounts:		
Water rents	75,808.29	
Building purposes	3,660.19	
		79,468.48
Total revenues for the fiscal year 1918		782,159.36

Water services:		
In use June 30, 1919	70,935	
Installed, 1919	555	
		71,480
Abandoned, 1919		215
In use June 30, 1919		71,275
Metered		61,443
Not metered		9,832
Percentage of services metered		86

REPORT OF THE SANITARY ENGINEER.

WASHINGTON, D. C., *September 1, 1919.*

SIR: In submitting this, my twelfth annual report of the several engineering branches under my direction which include the design, construction and maintenance of the sewerage system of the District of Columbia, and the sewage disposal system, with the collateral sanitary studies and the hygienic study of river waters and stream pollution from exterior sources, as well as the layout and arrangement, supervision of construction and recording and mapping of all subsurface construction of public service corporations, I desire to record the highly satisfactory and significant accomplishments of this division of the engineer department during the fiscal year 1919. Notwithstanding the great difficulties encountered throughout the year, due to the disturbed conditions as a result of war, all of these activities were carried on in a systematic and orderly manner, without interruption or neglect in any function, and with such zeal and determination that the sewerage system and the sewage disposal system were actually in better physical condition than at the close of any previous fiscal year.

The increase in load on the sewerage systems due to the vast increase in population as well as to deficient street cleaning and its practical suspension during a great part of the year, with the resulting large volume of accumulated street cleanings washed into the sewers by every rain, were two extraordinary items of maintenance successfully met.

But perhaps more noteworthy is the fact that no prewar contracts were canceled, while at the close of the year every existing contract was either completed or well in progress of completion, including all of the prewar contracts with one exception, and in this exception such notable results were achieved as to merit special record in this report: The James Creek trunk sewer was placed under a contract aggregating a cost of $22,307.80 early in 1917, but when ordered to begin construction the contractor asked for several postponements on account of war conditions, until finally after long delay the work was readvertised. The lowest bid received was $44,688, more than double the original price. Considering this war price too large, I recommended rejection and requested authorization to proceed with the work by day labor, with the result that the work was entirely completed within the original contract time, by our own construction forces, although labor and material costs had nearly doubled, and the actual expenditure for this construction was $22,011.76, including proper charges for equipment used and for all other items, or $296.04 less than the original contract price, and $22,676.24 less than the lowest bid under readvertisement. No better evidence of the value and efficiency of the carefully organized construction force of this division could be cited. On the many works of emergency construction undertaken at the request of the War and other Federal Departments during this period, aggregating about $35,000, praise was received without exception for promptness, efficiency, and economy of construction. In thus recording these substantial evidences, it is a pleasure to acknowledge the loyal and devoted services of the engineering, drafting, clerical, and construction personnel in all of the work throughout the year. It is also worthy of note in this connection that this comparatively small personnel was depleted by the entry of 46 men into the military service and that the sanitary engineer was detailed on work for the War Department during half of this period, and 10 assistant engineers, inspectors, draftsmen, etc., were on service work practically for the entire period.

Owing to the difficulties and delays affecting construction, due to war, which prevailed throughout this and the preceding fiscal year, and the concentration of effort under these adverse conditions toward completing all prior construction contracts, it was found impracticable to make great headway with the authorized construction program for the fiscal year 1919, and, as a result, a large balance of the three principal construction appropriations remained unexpended at the close of the year. The further underlying reason for this condition was the fact that prices bid for construction work had advanced to such figures as to preclude completing a considerable part of these construction projects with the funds available, which were based on estimates submitted two years earlier. How great this advance in prices was may be indicated by the prices bid for digging trenches for sewers and for concrete masonry during the past several years, which were as follows:

	Excavation per cubic yard.	Concrete masonry per cubic yard.
	$1.00	$7.65
	1.75	8.00
	2.85	15.40
	2.80	14.90

hat the great advance in the cost of sewer construction as indicated by above figures with fixed appropriations reduces the amount of sewer con- ıction may be shown by the cost per linear foot of a typical 6-foot diameter er at the contract prices bid for each of these years. This cost is as ows:

1917, cost per linear foot of 6-foot sewer	$10.62
1918, cost per linear foot of 6-foot sewer	13.37
1919, cost per linear foot of 6-foot sewer	24.40
1920, cost per linear foot of 6-foot sewer	23.40

›wing that from 1917 to 1920 the cost has increased 220 per cent and that 45 per cent of the work done under 1917 prices could be done under 1920 ces, with equal appropriations for both years. But the essential work of s division has been further reduced by the allowance of far less funds for 0 than were allowed for 1917. Under the 1917 appropriation a total of 5,000 was allowed for the three principal construction appropriations, and 1920 but $267,000 was allowed, or 62.8 per cent of the 1917 funds. This luction in funds and the above increase in cost of construction indicate that ly about 35.6 per cent of the normal work, as submitted in estimates for 0, can be constructed during the fiscal year 1920.

The details of the work of this division are given in the following sections, th accompanying tables appended thereto.

ASA E. PHILLIPS, *Sanitary Engineer.*

The ASSISTANT TO THE ENGINEER COMMISSIONER.

SECTION A.—ENGINEERING DATA, DESIGNS, AND DRAINAGE STUDIES.

The engineering data for the year included rainfall, run-off, and river flow cords, as well as the determination of the oxygen content of the river waters a check on the effect of the present discharge of untreated sewage from e District of Columbia into the Potomac River. The laboratory work on ese tests is done by the United States Public Health Service, and acknowl- gments are due for valuable assistance in securing this data.

METROPOLITAN SEWERAGE PROJECT.

The metropolitan sewerage project, which contemplates the removal of all wage from Maryland towns now entering small streams which flow into d through the national parks in the District of Columbia, provides for con- cting the Maryland interceptors to be laid along the lines of these streams ith the sewage-disposal system of the District of Columbia. While the ›rk of completing the necessary interceptors within the District is far lvanced, no actual construction has been begun by the sanitary commis- ›n organized by the State of Maryland of the interceptors within the State d no beneficial results can accrue under the authority granted by Congress d by the State until these Maryland interceptors are built. Meanwhile, the rious contamination of park streams by the discharge of raw sewage from ese Maryland towns is increasing, and bacteriological examinations of the aters of the streams indicate that their purity is so affected as to render the ›read of water-borne disease probable by children in the parks playing in ese streams.

While war conditions unquestionably have had the effect of delaying the ewerage construction necessary to eliminate this stream pollution, it is be-

lieved that construction by the State should be begun without further del in the interests not only of the national parks within the District of Columbi but also in the interests of the Maryland communities themselves which a polluting these small streams at their very doors.

This project was originally proposed in my annual report for the fiscal ye 1909, from which the following is abstracted:

"The only practical solution of this problem is believed to be in the form tion of a metropolitan district, under the control of a State and national boar with power to construct the necessary valley interceptors for the removal the sewage, and that these interceptors be arranged so as to discharge at t State line into the interceptors of the sewage-disposal system of the Distri of Columbia, the District to be reimbursed for the cost of pumping and handli the sewage from the Maryland towns and villages by a State-collected t levied upon the communities benefited, which would also defray the cost construction and maintenance of the State system."

RIVER CONDITIONS AS TO SEWAGE DISPOSAL.

The condition of the river waters in the vicinity of the main outfall a below was generally very good throughout the year, the beaches were fr from any evidence of sewage discharge, and the surface waters clear of t sleek produced by the oily wastes. The drop in oxygen content, however, bel 50 per cent for the first time in the history of the disposal works may be co sidered as a warning that the installation of primary treatment works can n be safely deferred for a much longer period. Under appropriation already ma the site for these treatment works is now being acquired, and within the ne 12 months it is proposed to submit estimates for beginning construction.

Oxygen tests are made to determine the condition of the river waters in t vicinity of the main sewage outfall, and for comparison similar tests a made on samples of upper river water above the area considerably affect by discharge from the sewerage system.

The following table gives the maximum, minimum, and mean oxygen conte for each month of the fiscal year and the similar record for the two p ceding years:

Comparative oxygen tests of samples of Potomac River water taken near ma sewage outfall and from the upper river for the past three fiscal years.

Fiscal year.	Location of samples taken on Potomac River.	Oxygen per cent saturation.											
		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Ju
	Mean:												
1917	Dilution basin..	87	77	73	74	74	90	100	(1)	100	97	79	
	Upper river.....	93	93	88	95	98	100	100	(1)	99	98	96	
1918	Dilution basin	64	65	70	64	(1)	91	(1)	(1)	(1)	(1)	(1)	(
	Upper river.....	87	90	92	94	(1)	97	(1)	(1)	(1)	(1)	(1)	(
1919	Dilution basin	(1)	70	74	63	82	88	(1)	(1)	(1)	90	91	(
	Upper river.....	(1)	74	90	89	92	96	(1)	(1)	(1)	98	97	(
	Minimum:												
1917	Dilution basin..	78	74	63	65	65	83	100	(1)	97	94	60	
	Upper river.....	87	87	81	91	97	100	100	(1)	100	96	92	
1918	Dilution basin..	43	55	55	59	(1)	91	(1)	(1)	(1)	(1)	(1)	(
	Upper river.....	81	86	89	84	(1)	97	(1)	(1)	(1)	(1)	(1)	(
1919	Dilution basin..	(1)	45	52	62	76	82	(1)	(1)	(1)	86	88	(
	Upper river.....	(1)	49	95	92	95	95	(1)	(1)	(1)	96	95	(
	Maximum:												
1917	Dilution basin..	96	80	84	84	84	98	100	(1)	100	94	60	
	Upper river.....	87	87	95	91	97	100	100	(1)	100	96	92	
1918	Dilution basin..	43	55	55	59	(1)	91	(1)	(1)	(1)	(1)	(1)	(
	Upper river.....	81	86	89	84	(1)	97	(1)	(1)	(1)	(1)	(1)	(
1919	Dilution basin..	(1)	87	93	72	85	95	(1)	(1)	(1)	98	95	(
	Upper river.....	(1)	84	95	92	95	98	(1)	(1)	(1)	100	99	(

[1] Sampling interrupted.

The following is a tabulation of the flow of the Potomac River for ea month of the year together with the average discharge through the outfa The latter includes considerable storm water, ground water, and stream fl from suburban areas, as well as leaks and wastes of the water-supply syste

The actual ratio to river flow is given in this tabulation, as well as the ratio of effective dilution obtained:

River flow and dilution ratio.

Month.	River flow.			Outfall discharge.	Ratio of mean pumpage to mean river flow.	Effective dilution obtained.[1]
	Maximum.	Minimum.	Mean.			
1918.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Second-feet.*		
July	6,100	2,710	4,220	106	1:39	91:1
August	4,550	2,875	3,700	112	1:33	97:1
September	8,750	2,490	4,956	107	1:46	107:1
October	5,060	1,350	2,298	102	1:23	46:1
November	14,000	2,580	7,240	105	1:69	156:1
December	53,750	3,225	18,265	102	1:179	393:1
1919.						
January	62,500	9,160	18,408	105	1:175	400:1
February	13,750	5,260	7,482	95	1:79	161:1
March	33,500	8,650	15,554	104	1:150	335:1
April	17,625	6,725	11,159	120	1:93	241:1
May	80,875	5,840	22,861	116	1:175	492:1
June	17,625	5,010	8,760	109	1:80	189:1

[1] This column indicates the ratio of mean river flow to sewage, rated at 30 gallons per capita per day for the contributing population.

During the past 12 months the river flow has fallen below 1,400 second-feet on 1 day, below 1,600 second-feet on 4 days, below 1,800 second-feet on 7 days, below 2,000 second-feet on 15 days. The minimum flow was 1,350 second-feet on October 20, 1918, and the maximum flow was 80,875 second-feet on May 12, 1919. The mean flow for the year was 10,440 second-feet. The minimum flow for the preceding year was 800 second-feet, the maximum flow 139,000 second-feet, and the mean flow 11,000 second-feet.

Average flow Potomac River in second-feet.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915	34,368	33,853	10,341	5,449	7,350	25,398	3,343	8,418	6,668	8,820	4,500	8,332
1916	15,285	19,416	31,126	24,892	9,983	17,625	8,958	4,578	3,015	2,849	1,940	3,766
1917	11,600	9,321	30,309	10,018	7,020	8,849	4,830	3,370	1,700	6,000	4,780	3,630
1918	(1)	40,990	16,630	50,280	7,760	4,150	4,220	3,700	4,956	2,298	7,240	18,265
1919	18,408	7,482	15,550	11,160	22,860	8,760	.....	.....	.....	.....	.....	.....

[1] No record on account of ice.

RAINFALL AND RUN-OFF.

Data for run-off studies includes rainfall records from 3 automatic and 21 ordinary rain gauges, distributed over 50 square miles of area, as well as discharge and flow-line observations for excessive storms in a number of the main drainage lines.

But three storms of exceptional intensity occurred during the year. The maximum was on June 27, 1919, beginning at 12.20 p. m. and lasting 35 minutes, when 1.48 inches were recorded at Twenty-fourth and M Strets NW., with a maximum rate of 4.92 inches per hour for a 20-minute period.

Excessive storm of June 27, 1919.

DEPTH OF PRECIPITATION.

[Depth in inches at time indicated.]

Gauge.	12.20	12.25	12.30	12.35	12.40	12.45	12.50	12.55
No. 4, Twenty-fourth and M Streets NW	0.00	0.39	0.87	1.23	1.32	1.37	1.46	1.48
No. 10, First and O Streets SE	.00	.00	.00	.25	.79	.87	.93	.93
No. 16, Twenty-first and A Streets NE	.00	.00	.00	.00	.13	.35	.42	.48

Excessive storm of June 27, 1919—Continued.

UNIT DEPTHS OF PRECIPITATION.

[Depth in inches for each 5-minute period.]

Gauge.	12.20 to 12.25	12.25 to 12.30	12.30 to 12.35	12.35 to 12.40	12.40 to 12.45	12.45 to 12.50	12.50 to 12.55
No. 4, Twenty-fourth and M Streets NW	0.39	0.48	0.36	0.09	0.05	0.09	0.10
No. 10, First and O Streets SE	.00	.00	.25	.54	.08	.06	.06
No. 16, Twenty-first and A Streets NE	.00	.00	.00	.13	.22	.07	.06

RATE OF PRECIPITATION.

[Rate in inches per hour during periods of time indicated.]

Gauge.	5 minutes.	10 minutes.	15 minutes.	20 minutes.	25 minutes.	30 minutes.	35 minutes.
No. 4, Twenty-fourth and M Streets NW	4.68	5.22	4.92	3.96	3.29	2.92	2.92
No. 10, First and O Streets SE	.00	.00	3.00	4.74	3.48	2.79	2.79
No. 16, Twenty-first and A Streets NE	.00	.00	.00	1.56	2.10	1.68	1.44

The following tabulations give the total rainfall for the three excessive storms as recorded at each of the 24 gauges and the annual rainfall by months:

Tabulation of the total observed rainfall for the three excessive storms of the fiscal year 1919 as recorded at 24 stations.

Station No.	Location.	Radial distance in miles.	Total rainfall.		
			July 12, 1918.	July 25, 1918.	June 27, 1919.
1	Pennsylvania Avenue and Thirteenth Street NW	0.00	1.37	1.61	1.62
2	Tenth and G Streets SW	.40	1.70	.60	1.15
3	Seventeenth and K Streets NW	.60	1.00	1.38	1.40
4	Twenty-fourth and M Streets NW	1.20	1.04	1.08	1.46
5	Delaware Avenue and C Street NE	1.20	1.75	.50	(1)
6	New York Avenue and New Jersey Avenue NW	1.20	1.12	.90	1.42
7	Seventeenth and U Streets NW	1.40	1.32	1.58	1.45
8	North Carolina Avenue and Seventh Street SE	1.90	1.88	.62	1.25
9	Rock Creek and Massachusetts Avenue NW	2.00	1.58	.92	.90
10	First and O Streets SE	2.10	1.15	.82	1.25
11	Dent Place and Thirty-fifth Street NW	2.20	1.75	.50	1.19
12	Filtration plant	2.20	1.32	1.58	1.20
13	Maryland Avenue and Thirteenth Street NE	2.30	1.88	.55	1.42
14	Zoological Park	2.40	1.50	.90	1.06
15	Park Road and Holmead Place NW	2.40	1.88	.92	(1)
16	Twenty-first and A Streets NE	3.00	.90	.80	.70
17	Fourteenth and V Streets SE	3.00	1.25	.75	.70
18	Twelfth and Monroe Streets NE	3.30	1.20	.62	.55
19	Fourth Street and Nichols Avenue SE	3.90	.78	1.62	.75
20	Nebraska Avenue and Tunlaw Road NW	4.20	1.50	.90	(1)
21	Georgia Avenue and Nicholson Street NW	4.40	.78	.55	(1)
22	Minnesota Avenue and Gault Place NE	4.70	1.38	1.60	1.25
23	Conduit Road and Little Falls Road NW	5.10	.94	.90	.38
24	Great Falls, Md	16.00	.80	.80	.27

[1] No record.

The precipitation by months for the fiscal year was recorded as follows:

1918.	Inches.		Inches.
July	3.79	February	2.01
August	1.88	March	4.02
September	2.79	April	3.71
October	.86	May	5.27
November	1.48	June	3.44
December	4.65	Total	37.37
1919.			
January	3.47		

TIDAL RANGE.

The automatic recording gauge located at the main sewerage pumping station, on the Anacostia River, about 1½ miles above its junction with the Potomac River, indicated the following for the fiscal year: Maximum high water, October 26, 1918, +2.4 feet (District of Columbia datum) or 1.7 feet above normal; minimum low water, November 24, 1918, —5.1 feet (District of Columbia datum) or 2.9 feet below normal.

The maximum range of tide for each month of the fiscal year was as follows:

Maximum monthly range of tides.

1918.	Tide range in feet.	1919.	Tide range in feet.
July	4.1	January	4.6
August	4.1	February	4.4
September	4.5	March	5.4
October	4.4	April	4.9
November	7.1	May	3.8
December	4.6	June	4.3

Studies of new areas for both storm and sanitary drainage for future development of the sewerage system were continued throughout the year; these advance studies for new trunk lines and important extensions in undeveloped areas are kept well in advance of actual construction, as a means of economic and foresighted planning. For more immediate construction, sanitary drainage and separate system studies were made for new areas in Petworth, Sixteenth Street Heights, Pinehurst, Chevy Chase, and Massachusetts Avenue extended; while for storm drainage studies were made for new areas in north Petworth, Klingle Ford Valley, Luzon Valley, Spring Road, Broad Branch Valley, Bennings, and Congress Heights. In the older portions of Washington, where existing sewers are inadequate or sanitarily obsolete, studies for improving the drainage system were continued, and in the more urgent cases new sewers were constructed as far as conditions permitted. Detail construction plans were prepared for Reno Road, East Brookland, Klingle Valley, and Luzon Avenue trunk sewers, and for the extension of the sanitary concrete cunette invert, replacing the old wood floor in the large 30-foot span Tiber sewer.

Contract plans, specifications, and proposals were prepared for trunk sewers in Illinois Avenue from Gallatin to Webster Streets NW.; Minnesota Avenue from Seventeenth Street to Good Hope Road SE.; Seaggs Branch from Thirty-fourth Street to the Philadelphia, Baltimore & Washington R. R. NE.; Upper Piney Branch from Fourth and Butternut to Third and Aspen Streets NW.; also for relief sewers in Ninth Street NE.; Twelfth Street SE., and T Street NW.

In connection with the sewage-disposal system, designs were prepared for special construction for the upper Potomac interceptor and for new sections of this important intercepting sewer, as well as for special construction on the Anacostia main interceptor at the Seaggs Branch crossing. The Rock Creek pumping station was designed and detailed plans and specifications prepared for the substructure and for the mechanical equipment. This station will be electrically operated with automatic control so as to reduce the expenditure

for attendants to a minimum. It will have an initial capacity of 15,000,000 gallons daily, delivering the entire sanitary flow from the Potomac River Valley above Rock Creek to the sewage-disposal system.

Throughout the year the underground construction work of the public-service corporations was supervised, notwithstanding the limitations heretofore referred to, and all such construction accurately recorded and mapped. Details of this work are set forth under section G of this report. In addition, excellent progress was made on the underground survey and the mapping of all subsurface structures on large scale original maps, 44 sheets of this standard set of maps having been completed to date.

The daily records of the maintenance and operation of the sewerage system and the sewage disposal system, as well as of the pumping stations and mechanical plants, have been carefully analyzed and the results tabulated in the comparative daily and annual statements recorded. These studies are made with a view of checking the efficiency and economic results in both operation and maintenance of the various working units. The comparative study of unit costs of construction and operating costs furnishes the only reliable index of the continued efficiency of the various units and is a check on performances as well as indicative of any economic adjustments required in the several organizations. Record charts of daily water consumption by the mechanical plants are prepared and the results analyzed with a view of limiting the consumption to the least possible draft on the city water supply consistent with proper sanitary maintenance. Records on the card system show the daily motor, pumping, engine, and boiler service results in connection with coal and electric current consumption as a check on the efficient upkeep of the mechanical plants.

Recapitulation of the sewerage system and sewage-disposal system.

Constructed during the fiscal year 1919:		
Main sewers	miles	2.82
Pipe sewers	do	5.16
Total	do	7.98
Mileage in service June 30, 1919:		
Main sewers	miles	147.79
Pipe sewers	do	591.03
Total	do	738.82
Expended for construction during fiscal year 1919:		
Sewerage system		$282,028.55
Sewage-disposal system		83,337.33
Total		365,365.88
Total expenditures for construction to June 30, 1919:		
Sewerage system		$14,231,065.00
Sewage-disposal system		4,803,662.25
Total		19,034,727.25

SECTION B.—OPERATION AND MAINTENANCE, SEWERAGE SYSTEM.

The maintenance work of the year included the inspection of all main trunk sewers, 147.79 miles in length, and the inspection of 978.50 miles of pipe sewers. General repairs were made throughout the system on both main and pipe sewers, and their condition as to maintenance was excellent. The most important betterment was the construction of 768 linear feet of concrete floor in the 30-foot span old Tiber sewer in canal between Second Street and Maryland Avenue SW. Substantial repairs were made to the concrete and brick masonry of the following important trunk sewers: Northeast boudary; B

Street and New Jersey Avenue; Tiber Creek; Indiana Avenue; I Street NW; Twelfth Street SE., and the Ninth Street SE trunk sewers. A new concrete spillway and apron was constructed in front of the storm water outlet of the Piney Branch trunk sewer; also a stone retaining wall was constructed along the water side of the Rock Creek interceptor near P Street, to secure the stability of this portion of the structure.

The operating work for the fiscal year included the cleaning of 27,867 storm-water catchment basins on permanently paved streets and 5,119 catchment basins on suburban streets and roads. The total quantity of silt removed from the city basins was 4,909 tons and from suburban basins 3,466 cubic yards. This is an increase of 792 tons from city basins and a decrease of 1,180 cubic yards from the amount removed from suburban basins during the preceding fiscal year. The cost of cleaning city basins, including the cost of labor and team haul, but exclusive of disposal, was $17,561.26, and the cost of cleaning suburban basins was $5,453.09, a total of $23,014.35. The average cost of cleaning city basins was $0.63 per basin, as against $0.436 per basin, the cost for the preceding year, and the average cost per ton of silt removed was $3.58, as against $2.74, the cost for the preceding year. The average cost of cleaning suburban basins was $1.065 per basin, as against $0.757 per basin, the cost for the preceding year, and the average cost per cubic yard of material removed was $1.573, as against $0.757, the cost for the preceding year. All material from the city basins was delivered aboard scows, removed from the city front, and deposited as fill back of the bulkhead line of the Anacostia River improvement, between Poplar Point and Giesboro Point, under permit from the United States Engineer Office. The cost of this disposal, including loading on scows, water transportation, unloading and grading, was $7,875.25, and the average cost of this work per ton removed was $1.604, as against $0.943, the cost per ton during the preceding year.

A total of 7,121 cubic feet of material was removed from sewers and 51,435 cubic feet from the settling chamber of the sewage disposal system; 940,348 pounds of screenings were removed from the sewage screens and incinerated.

The following tabulation indicates the total length of sewers at the close of the fiscal year and gives the length and expenditure for 20 years for operation and maintenance, based on the total appropriation for this work, but exclusive of sewage disposal maintenance. This tabulation indicates a reduction in annual expenditure per mile for operation and maintenance in the past 20 years from $122.52 to $67.76. This reduction in cost has been accompanied by increasingly thorough maintenance work and is solely due to developments in efficiency and economy of this important branch of the service.

Year.	Length of sewers.	Expenditure for maintenance.	Cost of maintenance per mile.	Year.	Length of sewers.	Expenditure for maintenance.	Cost of maintenance per mile.
	Miles.				*Miles.*		
1900	408.08	$50,000	$122.52	1910 [1]	567.98	$48,500	$85.39
1901	421.34	50,000	118.67	1911 [1]	589.74	50,000	84.70
1902	436.89	50,000	132.76	1912 [1]	618.53	50,000	80.84
1903	448.09	58,000	129.44	1913 [1]	644.28	50,000	77.61
1904	456.87	58,000	126.95	1914 [1]	661.49	50,500	76.30
1905	468.86	58,000	123.70	1915 [1]	682.11	50,000	74.03
1906	484.40	42,000	86.70	1916 [1]	702.06	50,000	71.22
1907 [1]	501.44	38,000	75.78	1917 [1]	717.38	50,000	69.69
1908 [1]	521.18	44,500	85.38	1918 [1]	730.84	50,000	68.41
1909 [1]	542.03	45,000	83.02	1919 [1]	737.90	50,000	67.76

[1] Exclusive of sewage disposal system.

There are now 737.90 miles of main and pipe sewers and 5,958 catchment basins. The work of operation and maintenance includes the inspection, flushing, cleaning, and repairing of all sewers and appurtenances. The record of cost of all work performed, including comparative costs with preceding years, together with an accurate daily statement of work performed, is maintained on the card system.

The following summary gives a statement of the amount of work in this division for the fiscal year, with details of expenditure for each class of work performed:

Cleaning and repairing, fiscal year 1919.

	Work.	Cos
CLEANING AND INSPECTION.		
Inspection interior of all main sewers.....miles..	737.90	$1,4
Inspection of pipe sewers.....do....	978.50	
Flushing of pipe sewers.....feet..	5,166,538	3,7
Flushing of manholes	13,032	
Flushing of storm-water receiving basins	21,322	1,4
Inspection and cleaning of gates, regulators, and sumps	4,284	2,7
Cleaning of main sewers.....feet..	4,043	1,5
Cleaning of pipe sewers.....do....	175,917	7,1
Cleaning of basin outlets	38	
Cleaning of gravel basins	5	1
CLEANING OF STORM-WATER RECEIVING BASINS.		
City basins	27,867	.....
Labor	.....	5,4
Teams	.....	12,1
Total	.....	17,5
County basins	5,119	.....
Labor	.....	1,9
Teams	.....	3,5
Total	.....	5,4
Removal by scows:		
Loader	.....	2,5
Transportation	.....	2,1
Unloader	.....	3,1
Total	.....	7,8
Total cleaning of storm-water receiving basins	.....	30,8
Cleaning sediment chamber	.....	2,8
Cleaning of screens	.....	6,1
Silt removed from main sewers.....cubic feet..	2,083	.....
Material removed from pipe sewers.....do....	4,702	.....
Silt removed from gravel basins.....do....	337	.....
Silt removed from storm-water receiving basins, city.....tons..	4,909	.....
Silt removed from storm-water receiving basins, county.....cubic yards..	3,466	.....
Silt removed from sediment chamber, main sewerage pumping station.cubic feet..	51,435	.....
Material removed from screens at main sewerage pumping station.....pounds..	940,348	.....
REPAIRS.		
Relaying pipe sewers and basin connections.....feet..	260	8
Abandoning pipe sewers.....do....	30	
Special large connections to pipe sewers	19	2
Repairing main sewers	.....	7
Inspection and repairs to house connections to main sewers	62	1
Settlements filled	6	2
Reconstruction of manholes	5	2
Adjusting and repairing manholes	69	1,1
Abandoning manholes	.....	.....
Replacing manhole frames	32	
Replacing manhole covers	48	
Reconstruction basins	8	2
Adjusting and repairing basins	146	2,-
Abandoning basins	3	
Replacing alley grates	9	
Replacing alley frames	9	
Miscellaneous work	.....	5,

SECTION C.—OPERATION AND MAINTENANCE, SEWAGE-DISPOSAL SYSTEM, PU ING STATIONS, SHOPS, AND YARDS.

Under this division is included the operation and maintenance of the r pumping station, also of substations, gates, and regulators; the mechan equipment of the sewer division, shops, stores, yards, and floating equipm as well as the installation of mechanical apparatus and special constructio

The main sewerage pumping station was in continuous operation throug the year handling the sewage of practically the entire District, as well a storm water from the 900-acre low area within the dike lines. The va pumping services were operated without interruption, and the preestabli hydraulic levels, both for sewage and storm water, were maintained wit

variation, both under normal conditions and throughout all storm periods. As an indication of the adequacy in design, construction, and operation of these works, it is to be noted that throughout the period of more than 12 years since they were put in service there has not been a single case of flooding in the 900-acre low area section within the dike lines or the interruption for a single minute in that period, of any of the various pumping services.

Main pumping station.—Sewage to the amount of 25,388,879,000 gallons and 865,155,000 gallons of storm water were pumped during the year, an increase of 1,713,879,000 gallons of sewage over the quantity pumped during the previous fiscal year.

The following is a tabulation of total pumpage by sewage pumps and storm-water pumps for each month of the fiscal year:

Total pumpage in gallons at the main sewerage pumping station.

Month.	Sewage.	Storm water.	Month.	Sewage.	Storm water.
1918.			1919.		
July	2,133,642,000	75,446,000	January	2,108,080,000	192,805,000
August	2,253,787,000	31,000,000	February	1,785,568,000	74,114,000
September	2,091,916,000	25,274,000	March	2,096,748,000	47,368,000
October	2,039,303,000	17,053,000	April	2,336,055,000	54,673,000
November	2,040,162,000	32,648,000	May	2,337,561,000	157,534,000
December	2,046,036,000	94,423,000	June	2,120,021,000	62,817,000

The expenditure of coal and other supplies for the year was as follows: Coal, 11,315,785 pounds; cylinder oil, pumping engine, 1,543 gallons; gas engine, 319 gallons; engine oils, 1,704 gallons; miscellaneous oils, 83 gallons; engine grease, 560 pounds; illuminating oil, 1,757 gallons; gasoline, 10,955 gallons. This latter includes all usage of the department during the fiscal year. There were 2,003 pounds of cotton waste used and 700 pounds washed and reused.

Poplar Point pumping station.—The Popular Point pumping station, located at the foot of Howard Avenue, was operated continuously throughout the year, handling all the sewage from the east side of the Anacostia River and discharging same into the main outfall of the sewage disposal system.

A total of 469,052,000 gallons of sewage was pumped during the year, a decrease of 108,748,000 gallons over the quantity pumped during the previous fiscal year. The following is a tabulation of the quantities pumped during each month of the fiscal year:

Total pumpage at the Poplar Point pumping station for the year.

Month.	Gallons.	Month.	Gallons.
1918.		1919.	
July	29,008,000	January	52,568,000
August	26,507,000	February	37,351,000
September	28,701,000	March	40,988,000
October	27,093,000	April	57,690,000
November	24,269,000	May	64,108,000
December	31,786,000	June	48,983,000

The expenditure of coal at the Poplar Point station in the combined heater and incinerator was 77,142 pounds, while 87,754 pounds of waste were removed from the screens and incinerated.

Woodridge substation.—The Woodridge substation was operated continuously throughout the year, handling all the sewage from the vicinity of Woodridge, D. C., and discharging same into the east side interceptor of the sewage disposal system.

Sewage to the amount of 14,519,000 gallons was pumped during the year. This is an increase of 8,086,300 gallons over the quantity pumped during the previous fiscal year. The current used was furnished by the Potomac Electric Power Co. at a rate of $0.06 per kilowatt hour. The average cost of pumpage for the year was $0.90 per million foot-gallons.

The following is a tabulation of the quantities pumped during each month of the year:

Total pumpage at the Woodridge substation for the year.

Month.	Gallons.	Month.	Gallons.
1918.		1919.	
July	1,055,000	January	1,024,300
August	918,300	February	1,143,500
September	987,800	March	1,698,800
October	987,400	April	1,713,000
November	989,600	May	1,105,000
December	1,347,700	June	1,548,600

The following are items of repair and betterment for the year:

Poplar Point pumping station.—The electric equipment and pumping units were regularly inspected and necessary repairs made throughout the year. The electric level indicators were overhauled and two switches replaced on same; also the dynamotors were overhauled.

Woodridge substation.—At the Woodridge substation, a new 3-inch, vertical, submerged pump, driven by a 10-horsepower, 25-cycle, 3-phase motor was installed, together with a new switchboard and two 3-pole alternating current circuit breakers. Unit No. 1 was thoroughly overhauled and equipped with new impeller shaft. New pipe lines were installed for both old and new pumping units and improvements made in the automatic control.

Main pumping station.—At the main pumping station, two new screens were made and installed on the intake main. Conduits were laid, new cables installed, and switch panel built for the emergency break-down electric power connection between this station and the electric plant in the United States navy yard. A dynamotor stand, with switchboard, was installed for operating the electric level indicators and the automatic stops on the generator engines. A new armature was installed on one of the motors in the machine shop and a new armature and controlling rheostat on the blacksmith shop forge and on the drill press motor. The receiving tower on the coal-handling plant was painted.

Valve bearings were refitted on engines Nos. 1, 2, and 3, Class I, connecting rod bearings renewed on engine No. 2, and oil guard ring of thrust bearing renewed on engine No. 3. Condenser pump No. 1 was overhauled and repaired, steam valves adjusted, and new valve stem made and installed, and condenser pumps No. 2 and No. 3 overhauled and repaired. Pump bearings were rebabbitted on the 3-inch electric drainage pump and a new impeller shaft installed. Risers and loops to 4 pumping engines and the steam main lines and valves in the generator room were recovered, and a 7-inch gate valve was placed on the main steam line.

In the boiler room, fire brick arches and walls were renewed in furnace of boiler No. 6 and arches rebuilt in furnaces Nos. 1, 2, and 5; bridge walls in furnaces Nos. 3 and 5; and side, center, and cross walls rebuilt in furnaces Nos. 1, 2, 3, 4, 5, and 6. One hundred new boiler tubes were installed. New ash pit aprons were installed and masonry repaired in all ash hoppers; also 3 ash pit walls rebuilt; grate bearer I beams renewed in 3 ash pits and 6 new dumping grates installed. All boiler blow-off valves and feed lines to all boilers were covered. The economizer was thoroughly overhauled, tubes cleaned and scraped; packing in 77 manifold and header joints was renewed, and 37 interior lids were replaced.

Stores.—All supplies, construction materials, and tools purchased during the year were received, inspected, and issued at storerooms and yards. An accurate daily record was kept on the card system and semiannual report made covering all expendable and unexpendable property. An inventory of all property is taken annually in order to verify the accounts and close the records for the year. All property, tools, and equipment unfit for further use were invoiced by the auditor's office for condemnation and sale.

Yards.—At the concrete plant in the First Street yard, 111 side basin tops, 120 corner basin tops, 210 cheek blocks, and 64 drip stones were made during the year. All silt removed from storm-water catchment basins was weighed and loaded on scows at this yard.

A new governor was installed on the gasoline unloader, derrick and electric loader cleaned and painted, and wharf repaired. A new landing was built for the marine railway, pile driver repaired, and a new base built for same. Minor repairs were made on railway trestle in the Poplar Point storage yard, where materials for use on sewer construction and repair work east of the Anacostia River are stored and issued.

The portable steam derrick was completed and equipped with Ledgerwood hoisting engine and Lambert rotary boom swinger.

Ink sludge collected in the settling basins, designed and built by this department, at the Bureau of Engraving and Printing was removed and disposed of by this division. These basins have operated with the most satisfactory results in preventing stoppage of the public sewers by this troublesome waste. Prior to their construction, large sums were expended in relaying sewers almost completely obstructed by these sludge deposits. The amount of this material removed and the cost of disposal is given in the following tabulation, the actual cost of the work being reimbursed by the Bureau of Engraving and Printing:

Material removed and the cost of cleaning the ink-settling basins of the Bureau of Engraving and Printing.

Date of cleaning.	Tons removed.	Unit cost removal per ton.	Unit cost team haul per ton.	Unit cost transportation and disposal per ton.	Total cost removal, transportation per ton.	Total cost removal and disposal.
1918.						
Aug. 22	39.3	$1.90	$1.08	$1.21	$3.11	$134.44
Sept. 19	41.8	1.81	1.06	1.20	3.01	138.63
Oct. 24	45.9	2.40	1.33	1.36	3.76	190.04
Nov. 27	34.6	2.03	1.18	1.22	3.25	122.60
December	50.3	2.10	1.03	1.17	3.27	182.71
1919.						
Jan. 24	52.5	2.11	1.15	1.26	3.37	195.25
Feb. 13	35.8	2.40	1.41	1.32	3.72	146.63
Mar. 10	45.5	2.22	1.14	1.25	3.47	164.16
Apr. 14	37.9	2.09	1.07	1.19	3.28	136.95
May 22	44.2	2.04	1.17	1.30	3.34	162.42
June 12	34.0	2.48	1.32	1.27	3.75	144.03
Total and average	461.8	2.14	1.18	1.25	3.39	1,717.86

Floating equipment.—The floating equipment was engaged in transporting materials removed from the sediment chamber and from storm-water catchment basins throughout the city to their points of disposal; in conveying construction materials to points along the water front where sewer work was in progress; in the transportation of chemists in connection with the sanitary survey of the Potomac River and in the transportation of inspectors and assistant engineers. The towboat *Virginia* was thoroughly overhauled and repaired and painted. Minor repairs were made to the launch and to five scows.

Shops.—In addition to the work of this division, enumerated in preceding paragraphs, the work of the shops included all repairs to pumping and other machinery, cleaning and painting wagons, motor trucks and construction equipment, minor repairs for maintenance and betterment of buildings, and the maintenance of electric lighting and power circuits. Twelve basin cleaning wagons, 3 hose reels, 17 wagons, and 4 carts were repaired; also 15 basin cleaning wagons, 1 hose reel, and 12 wagons were thoroughly overhauled and painted. Two autos were overhauled and one auto painted. Small tools were made as follows: Four chisels, 51 drills, 33 points, 32 wrenches, 219 picks, 9 cold cutters, 1 hammer, 1 set manhole lifters, 17 signs, and 67 miscellaneous tools. Small tools were repaired as follows: One hundred and ninety-six chisels, 233 drills, 470 points, 11 wedges, 3 hammers, 2,833 picks, 10 crowbars, 26 cold cutters, 5 axes, 95 saws, 12 wrenches, 3 basin scoops, 85 wheelbarrows, 35 mattocks, 13 sets manhole lifters, 24 signs, and 99 miscellaneous tools. One thousand five hundred and sixty-eight manhole irons were made during the year for use on construction work. Forms were made for 11 construction and repair jobs.

Miscellaneous construction.—Tide gates were built and hung at the storm-water outlets of the James Creek Valley and Easby Point trunk sewers and also for the two special tide-gate chambers on the James Creek Valley trunk sewer. The tide-gate chamber at the outlet of the New Jersey Avenue and B Street trunk sewer was cleaned and seven new tide gates built and hung. Screen cages for the new Rock Creek pumping station were built.

SECTION D.—CONSTRUCTION, SEWERAGE SYSTEM.

The following is a statement of the length of sewers constructed during the year and the cost of same aggregated for the several construction districts:

Section.	Length.	Cost.
	Feet	
1. County west of Rock Creek	11,984.07	$103,882.84
2. County east of Rock Creek	5,271.37	31,454.10
3. County west of Anacostia River	5,193.03	49,074.79
4. County east of Anacostia River	8,293.20	83,337.33
5. Washington City	11,526.67	97,616.82

The following is a detailed statement of sewers constructed in the various districts:

Western district, county west of Rock Creek.—In this area 7,224.87 linear feet of trunk sewers, and 4,759.20 linear feet of service sewers, a total of 11,984.07 linear feet were constructed as follows: Chevy Chase, 3,800.80 linear feet of service sewers; Cleveland Park, 1,461.50 linear feet of trunk sewers, and 320 linear feet of service sewers, a total of 1,781.50 linear feet; Woodley, 1,308.10 linear feet of trunk sewers, and 638.40 linear feet of service sewers, a total of 1,946.50 linear feet; Arizona, 2,525.50 linear feet of trunk sewers; Georgetown, 1,929.77 linear feet of trunk sewers. No storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contracts were let and work completed on the Klingle Road trunk sewer between Rock Creek and Connecticut Avenue, and the Reno Road trunk sewer between Macomb and Newark Streets. Work was completed on the construction of the Dalecarlia intercepting sewer, in tunnel, extending through the grounds of the Dalecarlia Reservation from Conduit Road to Falls Branch.

Central district, county east of Rock Creek.—In this area 655.80 linear feet of trunk sewers, 398 linear feet of service mains, and 4,217.57 linear feet of service sewers, a total of 5,271.37 linear feet, were constructed as follows: Takoma, 1,150 linear feet of service sewers; Petworth, 655.80 linear feet of trunk sewers, 398 linear feet of service mains, and 2,770.57 linear feet of service sewers, a total of 3,824.37 linear feet; Mount Pleasant, 130 linear feet of service sewers; Washington Heights, 167 linear feet of service sewers. Fifty-seven storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contract was let and work begun for the construction of the Piney Branch trunk sewer, extending from Georgia Avenue and Farragut Street to Eighth and Hamilton Streets NW.

Contract was let for the construction of the Luzon Avenue trunk sewer extending through the grounds of the Walter Reed Hospital between the line of Van Buren Street and the line of Butternut Street.

Eastern district, county west of Anacostia River.—In this area, between North Capitol Street and the Anacostia River, 1,986 linear feet of trunk sewers, and 3,207.03 linear feet of service sewers, a total of 5,193.03 linear feet, were constructed as follows: Eckington, 1,188.82 linear feet of service sewers; Brookland, 1,986 linear feet of trunk sewers, and 1,781.21 linear feet of service sewers, a total of 3,767.21 linear feet; Langdon, 237 linear feet of service sewers. Five storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Work was completed on the construction of the East Brookland trunk sewer, extending from Eighteenth and Newton Streets to Fifteenth and Lawrence Streets NE.

Work was begun on the construction of a junction chamber at the present terminus of the Michigan Avenue trunk sewer near Eleventh Place and Randolph Street NE.

Eastern district, county east of Anacostia River.—In this area, east of the Anacostia River, 4,956.20 linear feet of trunk sewers, 519.00 linear feet of service mains, and 2,818 linear feet of service sewers, a total of 8,293.20 linear feet, were constructed as follows: Anacostia, 1,892.50 linear feet of trunk sewers, 44 linear feet of service mains, and 2,818 linear feet of service sewers, a total of 4,754.50 linear feet; Congress Heights, 475 linear feet of service mains; Bennings, 3,063.70 linear feet of trunk sewers. No storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contract was completed on the construction of the Burnt Bridge Run trunk sewer extending from the Baltimore & Ohio Railroad to Minnesota Avenue SE. Work was resumed on the construction of the Stickfoot Branch trunk sewer between the Baltimore & Ohio Railroad and Nichols Avenue SE., also work was begun on the construction of the Good Hope Run trunk sewer extending from the Baltimore & Ohio Railroad to Eighteenth Street SE.

Contracts were completed on the construction of service sewers in Nineteenth Street SE. between Naylor Road and Minnesota Avenue; V Street SE., between the Baltimore & Ohio Railroad and Nichols Avenue; Shannon Place SE. between U and V Streets.

A special pile and platform foundation on the east shore of the Anacostia River, crossing Scaggs Branch in the line of the Anacostia main interceptor, was constructed by day labor.

Washington City district.—In this area, 894.90 linear feet of trunk sewers, 594 linear feet of service mains, and 11,526.67 linear feet of service sewers were constructed as follows: Northwest section, 126.90 linear feet of trunk sewers, 43 linear feet of service mains, and 2,725 linear feet of service sewers, a total of 2,894.90 linear feet; northeast section, 956.80 linear feet of service sewers; southeast section, 120 linear feet of service mains, and 5,327.17 linear feet of service sewers, a total of 5,447.17 linear feet; southwest section, 768 linear feet of trunk sewers, 431 linear feet of service mains, and 1,028.80 linear feet of service sewers, a total of 2,227.80 linear feet. Fifty-four storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contract was let and work completed for the construction of 768 linear feet of concrete invert in the Tiber Creek trunk sewer extending from Maryland Avenue to Second Street SW.

The James Creek Valley trunk sewer between N and P Streets SW. was completed by day labor. This construction will permit the abandonment of the old James Creek Canal between these limits.

The following tabulation shows the construction of the sewerage system, the average cost per mile, the funds appropriated for sewer construction, and the approximate population for each year for 20 years:

Year.	Population.	Expended for construction.[1]	Miles constructed.	Average cost per mile.
1900	279,000	$175,000.00	12.49	$14,011.21
1901	284,000	250,000.00	13.25	18,867.92
1902	289,000	230,000.00	12.87	17,871.02
1903	294,000	170,000.00	16.42	10,353.23
1904	300,000	172,000.00	8.78	19,589.98
1905	305,000	168,650.00	11.99	14,065.89
1906	310,000	170,000.00	15.54	10,939.51
1907	315,000	333,000.00	17.09	19,485.08
1908	321,000	281,800.00	19.74	14,275.58
1909	326,000	295,500.00	18.01	14,408.66
1910	331,000	224,975.00	25.51	8,815.17
1911	341,000	219,040.00	23.18	9,449.53
1912	352,000	320,000.00	24.68	12,965.96
1913	353,000	320,000.00	23.52	13,605.44
1914	356,000	345,000.00	17.21	20,046.48
1915	359,000	382,500.00	20.54	18,622.20
1916	360,000	360,800.00	19.28	18,713.74
1917	362,000	425,000.00	14.89	28,542.71
1918	396,000	432,000.00	13.47	32,071.27
1919	450,000	282,000.00	7.06	39,947.39

[1] Excluding sewage disposal system.

SEWAGE DISPOSAL SYSTEM.

Anacostia main intercepting sewer.—The contract for the construction of sections Nos. 7, 8, and 9 of this interceptor was completed during the year by the construction of 3,063.70 linear feet of 4 feet 6 inches by 5 feet brick and concrete sewer. This construction completed the Anacostia main interceptor from Poplar Point as far northward as Scaggs Branch, with exception of the Philadelphia, Baltimore & Washington Railroad crossing.

Crossing Scaggs Branch and in the line of construction of the Anacostia main interceptor, 176.80 linear feet of timber and piling platform was constructed by day labor. This work was necessary in advance of the construction of section No. 10 of this interceptor.

Upper Potomac intercepting sewer.—The contract for the construction of section No. 1 of this interceptor was completed during the year by the construction of 312 linear feet of 48-inch cast-iron pipe sewer crossing under Rock Creek and of 160 linear feet of 4-foot brick and concrete sewer. Work was begun on the construction of section No. 2 of this interceptor and completed as far westward as Wisconsin Avenue.

Contract was let for the construction of the concrete substructure of the Rock Creek pumping station at the northwest corner of Tweny-seventh and K Streets NW.

Length of main sewers and pipe sewers and the number of storm-water receiving basins constructed during the fiscal year ending June 30, 1919.

Appropriations.	Main sewers.	Pipe sewers.	Storm-water receiving basins.
	Linear feet.	*Linear feet.*	
Main and pipe sewers	1,488.90	5,539.74	46
Suburban sewers	8,421.30	2,431.51	42
Assessment and permit	.....	14,100.10	.....
Sewage-disposal system	4,993.47	.....	.....
Miscellaneous trust-fund deposits	.....	4,558.93	16
Miscellaneous appropriations	.....	635.40	12
Total	14,903.67	27,265.68	116

SECTION E.—MAPS, RECORDS, AND DRAFTING.

Work was continued during the year on 10-feet=1-inch scale maps, showing all underground construction, vaults, building projections, curb, and street-railway tracks. Four such maps were completed during the year.

Drainage plats were prepared for 118 engineer department files and 104 plats prepared for construction of main and pipe sewers and receiving basins, also 23 plats showing assessment on account of connections from parcel property to public sewers.

Five new record maps of sewers have been made and one was replaced during the year. The work of posting current sewer construction on these maps was kept up to date as well as of new streets and alleys and much missing data of old work plotted from field surveys.

The counter tracings for use of the public for information have been kept posted to date with current construction as well as newly established or modified street grades. Three new sheets covering additional territory have been added during the year.

The 100-foot scale drainage study maps for the suburban portions of the District have been kept posted to date with current construction as well as with newly established or modified street grades and new subdivisions. In addition, nine old and badly worn maps have been replaced by new ones.

Eighty cards showing assessment pending for future sewers have been made, and 55 engineer department files, inclosing plats showing the construction of service sewers abutting assessable property have been forwarded through the chief clerk, engineer department, to the assessor. Three letters have been forwarded to the health officer with plats as notice of newly constructed service sewers abutting existing houses.

The card index of newly made subdivisions has been kept up to date, 199 aving been added. In addition to this index record, these subdivisions re posted on record maps, record made, and plats made for the assessor upon ubdivision of parcel property where same abuts service sewers in order that ie proper special assessment may be levied.

One hundred and four new grade sheets for work constructed during the ear have been filed and 14 old and badly worn sheets replaced.

Nineteen paving schedules of the surface division, covering 169 paving jobs, ere examined, and where necessary, plats prepared for construction, recon-ruction, or abandoning of sewers in advance of paving.

Forty surface division grade maps involving the establishment of new street rades or modification of existing approved grades have been studied with eference to the effect on the drainage system.

Plans, estimates, proposals, and specifications have been prepared for the onstruction of sewers under 10 contracts.

Four plats and deeds for rights-of-way have been prepared in connection ith the extension of the public sewerage system, and all of same have been equired and recorded. These are listed in Table 16, appended to this report.

Work has been continued on elimination of privies and a card index kept osted of every privy maintained in the District. Permits were issued by the ealth officer for the erection of 42 new privies.

Section F.—Records and Accounts.

The work of this division included the preparation of requisitions and ouchers, records of costs of construction, cost keeping, preparing pay rolls, and aterial and equipment accounting. During the year 650 construction jobs, 1,086 foremen's reports, 42,306 card records, 1,453 supply bills, 507 pay rolls, ,003 requisitions, 277 transfer and refund vouchers, 346 engineer department les, 257 letters, and 29,098 miscellaneous reports were handled. The follow-ng financial statements of the various sewer appropriations and of expendi-ures from special funds gives a résumé of the operations for the year. The otal of these expenditures was $848,045.73.

SEWERAGE SYSTEM.

Cleaning and repairing sewers and basins:		
Appropriation		$91,000.00
Expended—		
Mechanics, laborers, and watchmen	$54,832.92	
Drivers and gate tenders	16,070.45	
Inspectors and other per diem employees	6,226.33	
Construction material and tools	2,302.04	
Repairs to equipment, equipment, and supplies	4,344.41	
Paid engineer department stables for forage, blacksmith work, etc	6,669.43	
Paid purchasing office for salaries	202.59	
Paid surface division for repaving work	225.86	
Paid corporation counsel's office for salaries	25.18	
		90,899.21
Unexpended balance		100.79
Maintenance and operation, sewage-pumping service:		
Appropriation		100,000.00
Expended—		
Mechanics, laborers, and watchmen	$50,671.54	
Coal, oil, waste, and other supplies	39,272.38	
Tools and equipment renewals	9,759.36	
		99,703.28
Unexpended balance		296.72

Main and pipe sewers and receiving basins:		
Appropriation		$107,000.
Expended—		
Day-labor construction	$40,218.85	
Construction material and tools	16,448.39	
Inspectors and other per diem employees	11,499.77	
Paid surface division for repaving work	3,150.37	
Paid purchasing office for salaries, etc	1,117.00	
Paid corporation counsel's office for salaries	25.18	
Paid engineer department stables for overhead charges	203.70	
		72,663
Unexpended balance [1]		34,336
Suburban sewers:		
Appropriation		200,000
Expended—		
Day-labor construction	$29,872.63	
Construction material and tools	41,672.57	
Inspectors and other per diem employees	12,427.05	
Paid surface division for repaving work	293.63	
Paid purchasing office for salaries, etc	1,327.00	
Paid chief clerk's office for salaries	184.00	
Paid corporation counsel's office for salaries	25.18	
Paid disbursing office for salaries	975.00	
Paid Assistant Engineer Commissioner's office for salaries	250.00	
Paid engineer department stables for overhead charges	203.70	
Outstanding contracts and material to complete same	42,000.00	
		129,230
Unexpended balance [1]		70,769
Assessment and permit work, sewers:		
Appropriation		125,000
Expended—		
Day-labor construction	$33,463.80	
Construction material and tools	63,067.98	
Inspectors and other per diem employees	8,667.74	
Paid surface division for repaving work	1,223.74	
Paid purchasing office for salaries, etc	1,439.43	
Paid chief clerk's office for salaries	184.00	
Paid Assistant Engineer Commissioner's office for salaries	250.00	
Paid corporation counsel's office for salaries	25.18	
Paid engineer department stables for overhead charges	203.70	
		108,525
Unexpended balance [1]		16,474
Miscellaneous trust-fund deposits, District of Columbia:		
Amount received from various depositors, fiscal year 1919		56,797
Expended—		
Day-labor construction	$20,811.03	
Construction material and tools	10,334.05	
Paid surface division for repaving work	1,347.43	
Contingent charges for engineering, supervision, wear of tools, etc	3,135.40	
		35,627

[1] The reason for this large unexpended balance was the failure to reappropriate s in the bill for the fiscal year 1920. In their annual estimates for 1920 the commissio asked for this reappropriation, and in the bill of the Sixty-fifth Congress, fourth ses this item was included. But when the bill failed of passage in that session and over to the Sixty-sixth Congress, through misunderstanding, the item for reappropri these funds was omitted from the bill.

Miscellaneous trust-fund deposits, District of Columbia—Contd.		
Inspection and engineering, cleaning, and repairing—		
Cleaning garage traps	$689.16	
Inspection of vaults	60.00	
Inspection of tunnels and conduits	105.00	
Inspection of private pipe lines	16.00	
Engineering and inspection of steam lines	172.00	
		$1,042.16
Returned to depositors		18,527.80
Carried over to 1920		1,600.00
Total		56,797.87
Construction from miscellaneous appropriations:		
Repayments		15,849.51
Expended—		
Construction—		
Day-labor construction	$6,646.66	
Construction material	4,413.98	
Paid surface division for repaving work	43.10	
Contingent charges for supervision, engineering, wear of tools, etc	957.59	
		12,061.33
Inspection, cleaning, repairing and other work—		
Inspection and repairs to trunk sewer connectons from houses	80.00	
Inspection and repairs to connections from fire hydrants	35.00	
Special large-size connections	270.00	
Adjusting basins and manholes in connection with surface division work	683.53	
Cleaning Bureau of Engraving and Printing ink basins	1,652.21	
Erection and removal of rope barricades from Peace Monument to Seventeenth Street NW., in connection with maintenance of public order (welcome home parade)	623.78	
Pumping storm water from flooded buildings, and underground tunnels	101.76	
Rental of sewer department Marine Railway for dry-docking vessels to various depositors	342.00	
		3,788.28
Total		15,849.61
Purchase and condemnation of land for rights of way for sewers:		
Appropriation		2,000.00
Expended—		
Cost of rights of way, titles, and recorder fees		41.30
Unexpended balance		1,958.70

Summary of expenditures, sewerage system.

Cleaning and repairing, 1919	$90,899.21
Sewage pumping service, 1919	99,703.28
Main and pipe sewers, 1918	41,071.60
Main and pipe sewers, 1919	72,663.26
Suburban sewers, 1917	44,117.17
Suburban sewers, 1918	97,159.78

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Suburban sewers, 1919	$87,230.76
Assessment and permit work, 1918	6,592.48
Assessment and permit work, 1919	108,525.57
Permit work, 1919	105.00
Miscellaneous trust-fund deposits, 1919	36,670.07
Miscellaneous appropriations, 1919	15,849.61
Condemnation, 1919	41.30
Outstanding contracts:	
Suburban sewers, 1917	11,700.00
Suburban sewers, 1919	42,000.00
Total	754,329.09

The following are payments into the Treasury on account of assessment and service sewers under the appropriations indicated below during the fiscal year 1919:

Assessment and permit work sewers	$42,902.99

SEWAGE-DISPOSAL SYSTEM.

Upper Potomac interceptor:		
Appropriation		$40,000.00
Expended—		
Day-labor construction	$427.74	
Construction material	14,314.26	
Outstanding contracts and materials to complete same	25,200.00	
		39,942.00
Unexpended balance		58.00
Sewage treatment works:		
Appropriation		60,000.00
Purchase of land, recorder's fees, etc.		20,360.60
Unexpended balance[1]		39,639.40

Summary of expenditures, sewage disposal system.

Anacostia main interceptor, 1916	$585.63
Anacostia main interceptor, 1917	32,414.17
Upper Potomac interceptor, 1917	25,024.06
Upper Potomac interceptor, 1918	54,190.18
Upper Potomac interceptor, 1919	14,742.00
Outstanding contracts:	
Upper Potomac interceptor, 1918	23,000.00
Upper Potomac interceptor, 1919	23,700.00
	173,656.04

TOTAL EXPENDITURES.

Sewerage system	$700,687.79
Sewage-disposal system	126,956.04
Purchase and condemnation of land for rights of way	41.30
Purchase of land for sewage treatment works	20,360.60
Total expenditures during fiscal year 1919	848,045.73

[1] Condemnation proceedings not completed.

ALLOTMENTS.

Statement of expenditures under allotments made to other departments from sewer appropriations, fiscal year 1919.

Appropriations.	Engineer stables.	Purchasing officer, salaries of inspectors and laborers at property yard.	Chief clerk, engineer department.	Disbursing office.	Corporation counsel's office.	Assistant to Engineer Commissioner's office.	Total.
Total allotments	$1,018.50	$4,086.02	$368.00	$975.00	$100.72	$500.00	$7,048.24
Expended:							
Cleaning and repairing	407.40	202.59	.....	.....	25.18	.....	.....
Main and pipe	203.70	907.28	.....	.....	25.18	.....	.....
Suburban sewers	203.70	1,327.50	184.00	975.00	25.18	250.00	.....
Assessment and permit work	203.70	1,398.14	184.00	.....	25.18	250.00	.....
Total expenditures	1,018.50	3,835.51	368.00	975.00	100.72	500.00	6,797.73

Statement of expenditures under allotments from outside departments to sewer department during the fiscal year 1919.

Contingent expenses:	
Total allotment	$1,200.00
Expenditures, stationery, printing, and supplies	1,175.89
Unexpended balance	24.11

Statement of expenditures for per diem employees, fiscal year 1919.

Cleaning and repairing	$3,841.42
Main and pipe	7,156.39
Suburban sewers	7,749.21
Assessment and permit work	2,727.64
Anacostia main interceptor	715.00
Upper Potomac interceptor	292.00
Total	22,481.66

The following is a statement of the unexpended balances of the three principal construction appropriations for 1901 to 1919, inclusive:

Fiscal year.	Main and pipe sewers.	Suburban sewers.	Assessment and permit sewers.	Total.
1901	$1,656.53	$2,237.61	.....	$3,894.14
1902	2,610.75	6,745.80	.....	9,356.55
1903	3,948.39	5,762.88	.....	9,711.27
1904	268.70	2,072.54	.....	2,341.24
1905	5,676.05	6,926.46	.....	12,602.51
1906	7,177.09	4,798.30	.....	11,975.39
1907	255.68	11,038.27	.....	11,293.95
1908	3,878.93	815.05	.....	4,693.98
1909	678.12	570.80	.....	1,248.92
1910	622.34	4,486.94	.....	5,109.28
1911	489.36	401.36	.....	890.72
1912	3,716.32	791.12	.....	4,507.44
1913	119.82	13.36	$118.16	251.34
1914	83.43	1,316.55	134.65	1,534.63
1915	37.00	441.18	3,785.50	4,263.68
1916	17.65	20.00	3,673.75	3,711.40
1917	127.73	302.42	1.38	431.53
1918	75.88	3,798.94	4,411.66	8,286.48
1919 [1]	34,336.74	70,769.24	16,474.43	121,580.41
Total	65,776.51	123,308.82	28,599.53	217,684.86

[1] The reason for this large unexpended balance was the failure to reappropriate same in the bill for the fiscal year 1920. In their annual estimates for 1920 the Commissioners asked for this reappropriation, and in the bill of the Sixty-fifth Congress, fourth session, this item was included. But when the bill failed of passage in that session and went over to the Sixty-sixth Congress, through misunderstanding, the item for reappropriating these funds was omitted *from the bill.*

Statement of expenditures for supervision, inspection, and record on account of underground construction, public-service corporations, and the amounts charged to each of the several corporations for the fiscal year 1919.

Expenditures:	
Supervision	$959.25
Inspection	1,318.58
Record	456.00
Total	2,733.83
Charged as follows:	
Potomac Electric Power Co	971.89
Chesapeake & Potomac Telephone Co	1,096.09
Washington Gas Light Co	508.27
Georgetown Gas Light Co	75.14
Washington Railway & Electric Co	1.00
Capital Traction Co	14.29
Western Union Telegraph Co	67.15
Total	2,733.83

SECTION G.—PUBLIC-SERVICE CORPORATION CONSTRUCTION.

This special work assigned to the division of sanitary engineering involves detailed determination of locations for new extensions of gas mains, electric, telephone, and telegraph conduits and their accessories, as well as methodic supervision of the work done under permits therefor and the accurate location of all work. Applications for these new constructions require careful location studies to avoid interference with existing and future construction, and particularly to assure economical and orderly occupation of the public space along predetermined systematic lines. During construction the work is regularly inspected, compliance with the terms of the permit are insisted upon, and an accurate record of the location of all work is obtained from field measurements. Record sheets are prepared showing the work in detail, and the work is then plotted on record maps and recorded on card system.

The work for the year may be summarized as follows:

Permits prepared upon application	1,176
New record cards made	1,176
New jobs inspected and recorded on sheet	1,004
Inspections of work under construction	2,794
Daily average jobs under construction	26
New gas mains laid ... miles	4.54
Electric duct laid ... do	64.90
Manholes constructed	596
Drains from manholes and railway tracks	37
Houses connected with gas mains	612
Houses connected for electric light and power	776

UNITED STATES GOVERNMENT WORK.

Steam lines, electric conduits, and tunnel were constructed as follows:

Steam lines.—From Potomac Electric Power Co. power house at Fourteenth and B Streets NW., to new Army and Navy buildings on south side of B Street, between Seventeenth and Twenty-first Streets NW., 4,221 feet of 12-inch steam main and 4-inch return pipe were laid.

From Potomac Electric Power Co. power house at Fourteenth and B Streets NW., to temporary buildings in Smithsonian Grounds and Armory Square south of B Street and east of Ninth Street NW., 4,620 feet of 6 to 14 inch steam main was laid.

From new power house on the southeast corner of New Jersey Avenue and D Street NW., to dormitories between Union Station and the United States Capitol, 2,589 feet of 5 to 10 inch steam main and 2,539 feet of 3 to 6 inch return pipe were laid.

Conduits.—In alley of square No. 296 connecting the Agriculture Department building 114 feet of 2-duct electric conduit was laid.

From United States Senate Office Building to dormitories between Union Station and United States Capitol 541 feet of 4-duct and 1,120 feet of 1-duct were laid.

Tunnel.—Two hundred and sixty feet of 10 by 10 foot tunnel crossing Pennsylvania Avenue, west of Fifteenth Street NW., and connecting United States Treasury building with Treasury Annex on the northeast corner of Pennsylvania Avenue and Madison Place was constructed.

PRIVATE PIPE LINES.

Permits prepared for gasoline and compressed-air pipes	25
Inspected, located, and plotted	14

PRIVATE VAULTS IN PUBLIC SPACE.

Applications approved	12
Vaults inspected, located, and recorded	23

WATER DEPARTMENT CONNECTIONS TO THE SEWERAGE SYSTEM.

There were 66 permits issued the water department for drains from fire hydrants, blow-offs, air valves, and watering troughs, and 74 were inspected and recorded. Certification of noninterference with existing underground construction of record was made in connection with nine conduits constructed by the electrical department, and three letters were written the public-service corporations at request of the surface division. In addition to the current work of the year, much data was collected as to the location of previously unrecorded vaults, mains, and conduits, but a large amount still remains to be done.

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TABLE No. 1.—*Sewerage system contract construction, fiscal year 1919.*

Contract No.	Constructed.		Total cost.	Appropriation.	Contractor.
	Length.	Size.			
	Feet.				
6199	.....	.....	[1] $4,217.18	Suburban, 1917....	W. F. Brenizer Co.
6202	1,230.00	3-foot 6-inch by 5-foot.....	13,695.41	.....do.....	L. M. Johnston.
6265	546.70 295.80	6-foot 6-inch by 6-foot..... .....do.....	5,008.34	.....do.....	W. F. Brenizer Co.
6266	.....	.....	[1] 10,517.37	.....do.....	Do.
6291	3,606.00	3-foot by 5-foot.....	13,689.19	.....do.....	
	.....	.....	49,678.94	Suburban, 1918....	W. H. H. Allen Co.
6294G	271.00 408.00 171.00	24-inch..... 18-inch..... 12-inch.....	5,426.07	Assessment and permit, 1918.	Wm. F. Cush.
6296	928.00	8-foot.....	8,088.09	Suburban, 1918....	W. F. Brenizer Co.
6509	1,642.93 649.07	4-foot 6-inch..... 4-foot.....	43,080.32	.....do.....	George Hyman.
6510	865.00	4-foot 6-inch.....	12,034.26	.....do.....	Do.
6514	564.00	2 by 3 foot.....	4,963.95	.....do.....	Louis Aiello.
6516	768.00	30-foot wide invert.....	17,239.38	Main and pipe, 1918.	W. F. Brenizer Co.
6705	.....	.....	([2])	Suburban, 1919....	Wm. F. Cush.
	11,945.50		187,638.50		

[1] Work not completed. [2] Work to be done in 1920.

TABLE No. 2.—*Sewage-disposal system contract construction, fiscal year 1919.*

Contract No.	Section.	Total cost.	Appropriation.	Contractor.
6206	Anacostia main interceptor, sections Nos. 7, 8, 9, and 10.	$32,673.05	Anacostia main interceptor, 1917.	W. F. Brenizer Co.
6281	Upper Potomac interceptor, section No. 2.	[1] 20,268.56 [1] 7,360.21	Upper Potomac interceptor, 1917. Upper Potomac interceptor, 1918.	Do.
6517	Upper Potomac interceptor, section No. 1.	46,880.69	.....do.....	Do.
6518	Upper Potomac interceptor, section No. 3.	([2])	.....do.....	Do.
		107,182.51		

[1] Work not completed. [2] Work not started.

TABLE No. 3.—*Sewer construction under permit system from the appropriation for assessment and permit work for the fiscal year 1919.*

Order No.	Location.	Length.	Size.	Amount of deposit.	Cost.		Total cost.	Amount returned.	For whom done.
					To District of Columbia.	To depositor.			
1	Alley of square No. 2551.....	*Feet.* 35	*Inches.* 12	$105	$105	$105	$210	.....	Harry F. Boryer.

E No. 4.—*Sewer construction under the assessment system from the appropriation for assessment and permit work for the fiscal year 1919.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.
	Feet.	*Inches.*			*Feet.*	*Inches.*	
.....	380.00	12	$890.69	132	398.00	10	$1,215.87
.....	500.00	12	1,312.32	133	195.00	10	524.13
.....	485.83	12	2,017.91	134	107.60	10	458.43
.....	355.20	12	1,044.47	135	183.70	10	501.33
.....	350.00	10	852.57	136	430.00	10	1,343.82
.....	.....	.....	(1)	137	50.00	10	254.07
.....	231.00	10	651.35	138	192.00	10	528.85
.....	530.80	10	1,640.47	139	106.00	10	417.78
.....	15.00	10	31.96	140	82.56	10	403.60
.....	320.00	10	938.48	141	214.00	12	723.74
.....	203.36	15	574.91	142	289.50	10	953.70
.....	266.25	12	631.40	143	186.60	12	[2] 635.83
.....	141.00	10	469.95	144	173.60	10	469.88
.....	147.00	10	355.20	145	505.40	10	1,156.44
.....	140.30	12	357.18	146	227.00	10	685.32
.....	687.00	12	1,767.33	147	120.00	12	[2] 531.30
.....	95.00	12	313.85	148	80.60	10	326.34
.....	270.00	12	999.65	149	307.31	10	947.08
.....	206.30	24	3,170.60	150	183.40	10	424.10
.....	283.00	21		151	192.00	10	701.96
.....	132.00	10	361.37	152	132.00	10	583.34
.....	120.00	10	346.01	153	100.00	10	431.14
.....	162.40	21	1,025.12	154	65.00	10	248.77
.....	57.00	10	286.05	155	247.00	12	818.25
.....	40.00	10	165.29	156	194.60	21	1,219.91
.....	38.00	18	900.85	157	143.15	10	526.30
.....	204.50	12		158	320.50	10	812.06
.....	410.10	24	2,836.76	159	45.00	12	[2] 253.60
.....	100.02	10	273.71	160	138.00	10	615.56
.....	126.40	12	1,183.82	161	108.00	12	432.13
.....	213.60	10		162	99.00	10	307.32
.....	200.00	12	608.30	163	103.72	12	280.13
.....	205.00	10	558.03				
.....	200.00	12	812.30	Total	14,021.30	.....	48,286.65
.....	285.00	10	1,173.64				

[1] To be done in 1920. [2] Repaving not reported.

E No. 5.—*Basin construction from the appropriation for main and pipe sewers, fiscal year 1919.*

Order.	Basins.	Total cost.	Order.	Basins.	Total cost.
.....	2	$304.83	521	1	$137.31
.....	8	1,741.69	527	2	614.21
.....	6	1,121.28	532	1	248.49
.....	2	232.15	534	2	181.01
.....	1	148.69	538	1	145.49
.....	3	344.10	540	1	160.21
.....	3	346.55	546	1	114.31
.....	1	154.32			
.....	3	425.15	Total	38	6,419.79

TABLE No. 6.—*Sewer constructed from the appropriation for main and pipe sewers, fiscal year 1919.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.
	Feet.	*Inches.*			*Feet.*	*Inches.*	
503			(1)	528	33.00	12	$167.60
504			(1)	529	21.00	24	[2] 431.63
506	174.66	24	$2,070.22	530	(3)		171.35
	116.84	18		531	(2)		152.15
507	126.90	24	1,257.13	533			(4)
508	66.70	24	1,190.45	535	463.00	15	2,456.80
509	115.00	15	1,315.12		15.00	12	
511	250.00	21	1,804.52	536	1,080.00	72 by 72	22,943.52
512	54.50	18	380.70		93.00	84 by 84	
513	75.00	12	188.89	539	(2)		104.95
514	310.80	12	1,247.25	541	(2)		91.85
515	120.00	12	478.13	542	66.00	24	533.06
520	157.00	24	854.23	543	30.00	72 by 72	1,061.85
522	18.00	15	146.02	544	54.00	24	566.31
523	270.30	12	878.63	545	12.74	18	70.23
524	590.40	24	5,418.25				
525	234.00	12	1,078.06	Total	5,011.04		49,162.86
526	463.00	12	2,103.96				

[1] Canceled.
[2] 1 manhole.
[3] Repaving not reported.
[4] To be done in 1920.

TABLE No. 7.—*Sewer construction from the appropriation for suburban sewers, fiscal year 1919.*

Order No.	Length, etc.	Size.	Total cost.	Order No.	Length, etc.	Size.	Total cost.
		Inches.				*Inches.*	
800	2 catch basins		$357.48	820	1 catch basin		$130.67
801	Apron and side wall		510.93	821	4 catch basins		696.20
802	57 feet	15	268.63	822	2 catch basins		410.75
	30 feet	10		823	do		278.26
803	4 catch basins		608.04	824	1 catch basin		471.92
804	1,308.10 feet	18	4,671.74	825	1 catch basin, 1 manhole		293.21
805	Junction chamber		[1] 632.70	826	2 catch basins		305.47
806	2 catch basins		288.39	827	do		311.95
807	4 catch basins		604.85	828	do		300.86
808	1 manhole		97.05	829	1 manhole		102.65
809	2 manholes		195.50	830	2 catch basins		440.63
810	9 feet	15	150.57	831	1 catch basin		185.94
811	433.80 feet	24 by 36	4,672.09	832	do		137.86
812	344.40 feet	12	1,503.74	833	do		171.95
813	335 feet	12	1,870.39	834	do		146.16
	93 feet	15		835	3 catch basins		464.92
814	1 catch basin		181.46	836	231 feet	18	1,091.66
815			(2)	837	1 catch basin		99.53
816	32.50 feet	54	1,685.21	838	Junction chamber		477.86
817	Resurface trench		874.98	839	Connection to culvert		33.61
818	1 catch basin		217.69				
819	do		187.15		2,873.80 feet		26,130.65

[1] Repaving not reported.
[2] Work canceled.

TABLE No. 8.—*Sewer construction under the whole cost system from miscellaneous trust fund deposits for fiscal year 1919.*

Order No.	Location.	Length.	Size.	Remarks.	Amount of deposit.	Cost of work.	Amount returned.	For whom done.
		Feet.	*Inches.*					
1000	East side Thirteenth Street NW., between G and H Streets.	124.00	12	2 manholes	$750.00	$715.25	$34.75	Chesapeake & Potomac Telephone Co.
1001	Fourteenth Street NW., between B and C Streets			Flume in sewer	50.00	7.30	42.70	Lake Stone Co.
1002	Twenty-eighth and Calvert Streets NW	135.00	12	4 catch basins	800.00	657.45	142.55	D. J. Howell & Son.
1003	East side Potomac Avenue SE., between Seventeenth and Nineteenth Streets.	700.00	15	2 manholes	4,000.00	2,984.06	1,015.94	U. S. Housing Corporation.
1004	West side Eleventh Street NW., between Clifton and Euclid Streets.	10.00	12		50.00	44.40	5.60	Nora A. Ryder.
1005	Intersection Twenty-ninth and Calvert Streets NW.	124.00	12	3 catch basins	600.00	420.85	179.15	D. J. Howell & Son.
1006	Union Station Plaza (dormitory project No. 54)			3 manholes	800.00	346.91	453.00	U. S. Housing Corporation.
1007	East boundary Massachusetts Avenue Heights Subdivision, between Garfield Street and Cathedral Avenue.	272.00 271.20	15 12		2,200.00	1,745.76	454.24	D. J. Howell & Son.
1008	Eighteenth Street SE., between C and New Streets.	359.85	12		(1)	1,507.78		U. S. Housing Corporation.
1009	C Street SE., between Eighteenth and Nineteenth Streets.	115.15	15	1 manhole	(1)	584.73		Do.
1010	Seventeenth Street SE., between A and B Streets	378.00	12	2 manholes	(1)	1,472.21		Do.
1011	New Street SE., between Eighteenth and Nineteenth Streets.	470.30	15		(1)	2,129.14		Do.
1012	Eighteenth Street SE., between New and B Streets.	350.00	12	1 manhole	(1)	1,376.38		Do.
1013	Nineteenth Street NE., between East Capitol and B Streets.	458.40 390.80	21 24	3 manholes	(1)	5,672.44		Do.
1014	New Jersey Avenue NW., between B and C Streets.			1 manhole	100.00	80.41	19.59	Do.
1015	East Capitol Street SE., between Seventeenth and Eighteenth Streets.	475.70	15	do	(1)	1,978.01		Do.
1016	Alley of square 288	102.50	10	do	600.00	599.43	.57	Chesapeake & Potomac Telephone Co.
1017	(2)							
1018	(2)							
1019	North Capitol and D Streets			1 manhole	100.00	99.82	.18	U. S. Housing Corporation.
1020	Thirteenth Street NW., between Spring Road and Quincy Street.			200 yards excess excavation.	250.00	209.45	40.55	Charles L. Tankerly.
1021	East Capitol Street SE., between Eighteenth and Nineteenth Streets.	445.00	15	1 manhole	(1)	1,739.54		U. S. Housing Corporation.
1022	Intersection Twenty-third and Water Streets NW.			do	350.00	334.07	15.93	W. G. Cornell Co.
1023	Nineteenth Street SE., between East Capitol and A Streets.	367.17	15	2 manholes	(1)	1,705.52		U. S. Housing Corporation.
1024	A Street SE., between Eighteenth and Nineteenth Streets.	328.30	12	1 manhole	(1)	1,549.46		Do.

[1] Whole cost deposit made of $34,210 by the United States Housing Corporation for cost of work; jobs 1008, 1009, 1010, 1011, 1012, 1013, 1015, 1021, 1023, 1024; total cost of work $19,715.21, refund $14,494.79.
[2] Canceled.

TABLE No. 8.—*Sewer construction under the whole cost system from miscellaneous trust fund deposits, etc.*—Continued.

Order No.	Location.	Length.	Size.	Remarks.	Amount of deposit.	Cost of work.	Amount returned.	For wham done.
		Feet.	*Inches.*					
1025	Ninth Street SW., between D and E Streets	242.06	18	2 manholes	1,575.00	1,575.00		Pennsylvania Railroad Co.
1026	I Street SE., west of Half Street			1 manhole	150.00	139.78	10.22	International Conveyor Co.
1027	Seventeenth Street NW., between Pennsylvania Avenue and H Street.	33.00	18		425.00	344.53	80.47	U. S. Housing Corporation.
1028	T Street NE., between Third and Fourth Streets			1 manhole	100.00	82.70	17.30	Washington Railway & Electric Co.
1029	Water Street SW., between Thirteenth-and-a-half and Fourteenth Streets.	381.00	8		1,500.00	986.06	513.94	L. D. Smoot, construction, Q. M. C., U. S. A.
1030	Van Ness Street NW., between Connecticut and Idaho Avenues.			1 manhole	150.00	113.90	36.10	Nolan Bros.
1031	Bolling Field	344.00 36.00 312.00	12 15 8		3,000.00	2,579.51	420.49	Department Military Aeronautics.
1032	do	475.00	8	2 manholes	1,200.00	682.79	517.21	Do.
1033	Pennsylvania Avenue, between First and Jackson Streets NW.			Rope barricade	750.00	719.45	30.55	R. N. Harper.
1034	I Street SE., between South Capitol and Half Streets.	20.00	12	1 manhole	75.00	74.25	.75	International Conveyor Co.
1035	Kalorama Road NW., between Seventeenth Street and Ontario Road.	10.00	8		40.00	38.78	1.22	E. R. Keene.
		7,730.43			19,615.00	35,297.12	4,033.09	

TABLE No. 9.—*Sewer construction and other work from miscellaneous appropriations, fiscal year 1919.*

Order No.	Location.	Work done.	Total Cost.	Appropriation.
1100	Madison Place NW., between Pennsylvania Avenue and H Street.	273 feet of 2 by 3 foot; 1 manhole.	$2,842.37	National security and defense.
1101	K Street NW., between Twenty-fourth and Twenty-eighth Streets.	3 catch basins.....	560.43	Improvements and repairs, District of Columbia, 1918, repairs to streets.
1102	South side Pennsylvania Avenue NW., between Rock Creek and Twenty-sixth Street.	43 feet of 12-inch; 1 manhole.	273.71	Improvements and repairs, District of Columbia, 1917.
1103	Nineteenth Street NW., between E and G Streets.	(1)	.....	
1104	Nineteenth Street and Virginia Avenue NW.	1 catch basin.....	124.55	Improvements and repairs, District of Columbia, 1918, northwest schedule.
1105	Northeast corner Seventeenth and Irving Streets NW.	.....do.....	150.91	Improvements and repairs, District of Columbia, 1918, repairs to suburban roads.
1106	Eighteenth and D Streets NW..	Adjusted 2 catch basins.	64.69	Improvements and repairs, District of Columbia, 1919.
1107	Square 739.....	2 catch basins.....	317.62	Streets, District of Columbia, 1919, disposal city refuse (garbage).
1108	Fourth and E Streets, NW.....	1 catch basin.....	122.79	Improvements and repairs, District of Columbia, 1919, repairs to streets.
1109	East side Seventh Street, between B north and B south.	.....do.....	193.08	Temporary buildings in Henry Park.
1110	Water Street SW., between Thirteen-and-a-half and Fourteenth Streets.	(1)	.....	
1111	Eighteenth and B, Nineteenth and B, Twentieth and B Streets NW.	3 catch basins.....	599.44	Improvements and repairs, District of Columbia, 1919, approaches, etc., U. S. B.
1112	Twenty-first Street and New York Avenue NW.	1 catch basin.....	153.25	Do.
1113	Fourteenth and C Streets NW..	.....do.....	144.64	Sidewalk and curbs, District of Columbia, 1919.
1114	T Street NE., between Third and Fourth Streets.	(1)	.....	
1115	Second and N Streets SE.....	1 manhole.....	262.92	Repairs and preservation, 1918, United States Navy Yard; Bureau of Yards and Docks.
1116	Bolling Field.....	(1)	.....	
1117	.....do.....	(1)	.....	
1118	Alley, square 3027.....	87 feet of 6-inch....	111.80	Improvements and repairs, District of Columbia, 1919, repairs to streets.
1119	Northeast corner Holmead and Park Road; Park Road west of Holmead Place NW.	2 catch basins.....	276.38	Construction suburban roads and suburban streets, District of Columbia, 1917.
1120	Northwest northeast corners Eleventh and Park Road; Northeast corner Thirteenth and Park Road NW.	2 catch basins.....	313.17	Construction suburban roads and suburban streets, District of Columbia, 1917.
1121	Southeast corner Twenty-third Street and Virginia Avenue NW.	1 catch basin.....	118.01	Improvements and repairs, District of Columbia, 1919, repairs to streets.
1122	Northeast, southeast corners Twenty-third and I Streets NW.	2 catch basins.....	323.41	Do.
1123	South side Water Street SW., front Fish Market.	4 gutter drops; 207 feet of 8-inch.	606.68	Building fish market, District of Columbia.
1124	Seventeenth and Kalorama and Ontario and Kalorama Roads NW.	4 catch basins.....	521.49	Construction suburban roads and suburban streets, District of Columbia, 1919.
1125	Crossing Scaggs Branch, between east shore Anacostia River and Bennings Road.	176.8 feet of platform, 8 feet 6 inches.	2,078.34	Anacostia main interceptor, 1916.
1126	Northeast corner Fifth and Shepherd, northeast corner Illinois Avenue and Shepherd Street NW.	2 platforms, 8 feet 6 inches.	239.71	Construction suburban roads and suburban streets, District of Columbia, 1919.
1127	Northwest corner Sixth Street and Rhode Island Avenue NE.	1 platform, 8 feet 6 inches.	163.19	Do.

[1] Work canceled.

TABLE No. 9.—*Sewer construction and other work from miscellaneous appropriations, fiscal year 1919*—Continued.

Order No.	Location.	Work done.	Total Cost.	Appropriation.
1128	Fourteenth and D Streets SW..	Unloading cement.	$70.56	Sewers, District of Columbia, 1919, assessment and permit work (purchasing office allotment, per diem salaries, and maintenance of District of Columbia property yard).
	Total		10,633.14	

TABLE No. 10.—*Inspectors and other employees of the sewer division, temporarily employed, and the appropriations from which paid, fiscal year 1919.*

Appropriations.	Inspectors.	Overseers.	Other employees.	Total.
Construction, sewerage system:				
Main and pipe sewers	$784.56	$1,888.20	$8,827.01	$11,499.77
Suburban sewers	1,640.85	1,185.50	9,600.70	12,427.05
Assessment and permit work	162.50	151.90	8,353.34	8,667.74
Construction, sewage-disposal system:				
Upper Potomac interceptor	292.00			292.00
Anacostia main interceptor		715.00		715.00
Sewage pumping service		338.27	912.62	1,250.89
Maintenance: Cleaning and repairing	666.28	1,860.00	3,700.05	6,226.33
Total	3,546.19	6,138.87	31,393.72	41,078.78

TABLE No. 11.—*Average cost of constructing pipe sewers and storm-water receiving basins for fiscal year 1919.*

Size of sewer.	Unit cost per foot.		Total cost per foot.
	Labor.	Material.	
8-inch diameter	$0.80	$0.60	$1.40
10-inch diameter	1.68	.84	2.52
12-inch diameter	1.91	1.01	2.92
15-inch diameter	1.92	1.29	3.21
18-inch diameter	2.38	1.54	3.92
21-inch diameter	2.59	2.71	5.30
24-inch diameter	3.62	3.36	6.98

TABLE No. 12.—*Average cost of constructing pipe sewers for 15 years.*

Year.	8-inch diameter.		10-inch diameter.		12-inch diameter.		15-inch diameter.		18-inch diameter.		21-inch diameter.		24-inch diameter.	
	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.
1905	$0.98	$0.38	$0.96	$0.55	$1.19	$0.60	$1.41	$0.77	$1.45	$0.89	$1.92	$1.01	$1.87	$1.43
1906	.87	.33	1.19	.47	1.26	.54	1.41	.67	1.53	.78	1.88	.93	2.45	1.24
1907	1.42	.43	1.43	.48	1.30	.56	1.46	.70	1.82	.85	2.09	.98	2.78	1.26
1908	1.34	.42	1.26	.50	1.44	.61	1.69	.75	1.91	.90	1.74	1.14	3.65	1.50
1909	1.34	.36	1.16	.36	1.46	.46	1.59	.56	1.58	.62	1.67	1.07	1.91	1.18
1910	1.00	.29	.99	.35	1.12	.43	1.19	.52	1.49	.66	1.52	.85	1.72	1.14
1911	1.01	.27	1.02	.32	1.17	.40	1.36	.52	1.64	.67	1.50	.75	1.82	1.08
1912	1.06	.25	1.08	.33	1.20	.39	1.46	.56	1.63	.67	1.70	.88	1.76	.98
1913	1.02	.26	1.07	.29	1.35	.38	1.53	.58	1.74	.75	1.93	1.08	2.20	1.28
1914	.78	.28	1.08	.45	1.32	.51	1.44	.69	1.56	.89	1.69	1.34	2.11	1.41
1915	.58	.19	1.12	.42	1.25	.51	1.56	.67	1.63	.89	1.89	1.18	1.78	1.45
1916	.76	.25	1.00	.36	1.05	.43	1.31	.62	1.49	.72	1.87	1.13	2.11	1.16
1917	.79	.40	.85	.44	.96	.56	1.11	.68	1.19	.95	1.25	1.31	1.31	1.37
1918	.77	.42	.98	.66	1.47	.92	1.56	1.14	1.71	1.78	2.02	2.49	2.16	2.79
1919	.80	.60	1.68	.84	1.91	1.01	1.92	1.29	2.38	1.54	2.59	2.71	3.62	3.36

TABLE No. 13.—*Contract prices for materials for 15 years.*

Year.	Cement per barrel.	Sand per cubic yard.	Gravel per cubic yard.	Terra-cotta pipe, linear foot.						
				8-inch.	10-inch.	12-inch.	15-inch.	18-inch.	21-inch.	24-inch.
1905	$1.13	$0.81	$0.85	$0.14	$0.20	$0.29	$0.40	$0.50	$0.74	$0.96
1906	1.35	.85	1.05	.125	.1647	.2236	.2997	.3672	.5454	.7263
1907	1.55	.74	.97	.155	.196	.261	.353	.443	.5454	.848
1908	1.52	.84	1.04	.155	.225	.30	.405	.51	.75	.975
1909	1.20	.55	.75	.155	.1707	.239	.3233	.4066	.5975	.7775
1910	.975	.54	.65	.125	.15	.20	.27	.3825	.5625	.73125
1911	.99	.395	.485	.115	.175	.22	.30	.42	.55	.715
1912	.98	.345	.435	.121	.176	.22	.31	.40	.59	.715
1913	.94	.345	.435	.105	.15	.18	.351	.494	.78	.845
1914	1.11	.54	.69	.11	.256	.25	.432	.608	.96	1.04
1915	1.04	.54	.69	.11	.23	.245	.43	.60	.96	1.04
1916	1.00	.54	.69	.11	.16	.21	.284	.40	.63	.6825
1917	1.33	.59	.74	.15	.23	.28	.39	.551	.90	.975
1918	1.95	.69	.99	.18	.42	.54	.72	1.00	2.00	2.25
1919	2.30	.95	1.35	.28	.4725	.6075	.8316	1.3785	2.23866	2.5498

TABLE No. 14.—*Maintenance work, sewerage system, for 10 years.*

	1919	1918	1917	1916	1915
Main sewers cleaned.....feet..	4,043	595	5,467	3,743	4,885
Pipe sewers cleaned.....do....	175,917	169,582	189,796	156,773	156,773
Pipe sewers flushed.....do....	5,166,538	5,222,929	5,983,299	6,949,719	6,077,129
Manholes flushed.....	13,032	13,083	15,597	17,611	15,473
Sumps, regulators, gates flushed and inspected.....	4,284	3,733	3,662	2,102	3,618
Basins flushed.....	21,322	17,984	17,938	15,793	15,242
Basins cleaned.....	32,986	30,481	39,256	45,514	51,201
Sludge removed:					
Pipe sewers.....cubic feet..	4,702	5,450	5,837	5,220	4,499
Basins.....do....	184,587	217,662	191,288	198,128	191,928
Sediment chamber.....do....	51,435	55,323	75,195	71,500	71,100
Screens.....pounds..	940,348	948,118	884,755	804,866	708,388
Main sewers inspected.....miles..	147.79	144.97	142.93	139.53	137.36
Pipe sewers inspected.....do....	978.50	989.00	1,133.00	1,316.00	1,150.00
Basins repaired.....	146	148	178	148	163

	1914	1913	1912	1911	1910
Main sewers cleaned.....feet..	1,113	4,525	4,071	300	1,185
Pipe sewers cleaned.....do....	145,767	123,545	122,838	161,190	149,626
Pipe sewers flushed.....do....	6,339,122	6,705,367	5,906,495	5,685,423	3,717,332
Manholes flushed.....	17,208	18,594	16,733	15,994	11,943
Sumps, regulators, gates flushed and inspected.....	4,222	3,949	2,245	530	568
Basins flushed.....	18,586	18,416	5,293	11,950	18,884
Basins cleaned.....	45,502	40,244	38,760	60,379	57,753
Sludge removed:					
Pipe sewers.....cubic feet..	4,079	3,723	2,479	3,538	5,052
Basins.....do....	160,660	168,696	147,741	166,428	190,204
Sediment chamber.....do....	62,856	66,744	53,140	58,131	58,577
Screens.....pounds..	798,666	869,640	1,084,128	833,617	890,230
Main sewers inspected.....miles..	134.00	130.90	126.24	122.78	114.00
Pipe sewers inspected.....do....	1,200.00	1,270.00	491.47	469.42	448.78
Basins repaired.....	124	117	141	155	249

TABLE No. 15.—*Summary of sewerage system for 25 years.*

Fiscal year.	Total length.			Total cost.		Actual cost maintenance and operation.	
	Trunk sewers.	Pipe sewers.	All sewers.	Sewerage system.[1]	Sewage-disposal system.	Sewerage system	Sewage-disposal system[2]
1895	74.48	260.20	334.68	$8,298,931.62	.....	$45,000.00	.....
1896	77.65	270.28	347.93	8,476,431.62	.....	45,000.00	.....
1897	81.36	284.06	365.42	8,661,731.62	.....	45,000.00	.....
1898	83.92	298.91	382.93	8,901,731.62	.....	50,000.00	.....
1899	85.65	307.36	393.01	9,047,731.62	.....	50,000.00	.....
1900	88.30	317.20	405.50	9,309,731.62	.....	50,000.00	.....
1901	90.89	327.86	418.75	9,515,731.62	.....	50,000.00	.....
1902	93.49	338.13	431.62	9,696,731.62	.....	58,000.00	.....
1903	96.31	351.73	448.04	9,817,731.62	.....	58,000.00	.....
1904	99.12	357.70	456.82	9,940,731.62	.....	58,000.00	.....
1905	103.21	365.60	468.81	10,040,881.62	.....	58,000.00	.....
1906	109.09	375.26	484.35	10,128,881.62	.....	42,000.00	.....
1907	112.20	389.24	501.44	10,363,881.62	$3,714,823.00	38,000.00	[2] $37,295.00
1908	113.94	407.24	521.18	10,536,681.62	3,952,768.65	44,500.00	[3] 38,625.00
1909	117.24	424.02	541.26	10,688,681.62	4,031,888.27	45,000.00	58,000.00
1910	119.20	448.78	567.98	10,860,556.62	4,095,630.70	48,500.00	58,000.00
1911	122.78	469.42	592.20	11,204,188.79	4,146,228.01	50,000.00	58,000.00
1912	126.01	492.52	618.53	11,539,374.28	4,228,555.94	50,000.00	59,500.00
1913	130.90	513.38	644.28	11,922,177.04	4,366,524.43	50,000.00	59,500.00
1914	133.50	527.99	661.49	12,470,940.74	4,495,830.13	50,500.00	62,000.00
1915	137.36	544.75	682.11	13,032,082.86	4,624,186.31	50,500.00	64,000.00
1916	139.53	562.53	702.06	13,294,695.25	4,671,279.19	50,000.00	64,500.00
1917	142.93	574.44	717.37	13,569,830.21	4,685,165.71	50,000.00	64,500.00
1918	144.97	585.87	730.84	13,949,036.45	4,720,324.92	50,000.00	64,500.00
1919	147.79	591.03	738.82	14,231,065.00	4,803,662.25	50,000.00	64,500.00

[1] Exclusive of sewage-disposal system.
[2] The sewage-disposal system went into operation July 1, 1906.
[3] Handling a part of the sewage only during these years.

TABLE No. 16.—*Rights of way acquired for sewer extension, fiscal year 1919.*

For combined system trunk sewer (Rock Creek main interceptor) line of Twenty-eighth Street, between Calvert Street and Rock Creek Drive through parcels 53/4, 53/5, and 53/6, and lots 15, 16, 17, 18, 813, and 815.[1]

For combined system trunk sewer (Piney Branch trunk) in line of Spring Road extended between Spring Place and Sixteenth Street NW., through parcel 83/20.[2]

For separate system sewer along line of the Metropolitan Branch of the Baltimore & Ohio R. R. through parcel 104/100.[2]

For separate system sewer along line of the Metropolitan Branch of the Baltimore & Ohio R. R. through lot 20, square 3184.[1]

TABLE No. 17.—*Electric conduits laid July 1, 1918, to July 1, 1919.*

Number of ducts.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Western Union Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	2,696	2,696	1,345	1,345	.....	.....	.....	.....	4,041	4,041
2	638	1,276	12,338	24,676	67	134	853	1,706	13,896	27,792
3	29	87	171	513	.....	.....	.....	.....	200	600
4	24,551	98,204	2,068	8,272	.....	.....	1,736	6,944	28,355	113,420
6	.....	.....	7,119	42,714	.....	.....	.....	.....	7,119	42,714
8	.....	.....	7,895	63,160	.....	.....	.....	.....	7,895	63,160
10	.....	.....	560	5,600	.....	.....	.....	.....	560	5,600
11	.....	.....	.....	.....	.....	.....	258	2,838	258	2,838
18	.....	.....	1,494	26,892	.....	.....	.....	.....	1,494	26,892
20	.....	.....	2,492	49,840	.....	.....	160	3,200	2,652	53,040
24	.....	.....	.....	.....	26	624	.....	.....	26	624
32	.....	.....	30	960	.....	.....	.....	.....	30	960
Total	27,914	102,263	35,512	223,972	93	758	3,007	14,688	66,526	341,681

[1] Consideration paid. [2] Voluntary dedication.

TABLE No. 18.—*Summary of electric conduits laid from Mar. 27, 1900, to July 1, 1919.*

Number of ducts.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Rwy. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	88,229	88,229	57,432	57,432				
2	160,819	321,638	341,587	683,174	15,809	31,618	13	26
3	265	795	6,097	18,291				
4	549,480	2,197,920	201,563	806,252	23,652	94,608	33,414	133,656
5								
6	46,127	276,762	115,695	694,170	8,173	49,038	5,117	30,702
7			82	574	29	203		
8	101,063	808,504	67,766	542,128	15,304	122,432	19,086	152,688
9	7,325	65,925	114	1,026				
10	850	8,500	30,260	302,600	32	320	8,275	82,750
11								
12	52,935	635,220	14,278	171,336	908	10,896	11,458	137,496
13	374	4,862	212	2,756				
14	1,224	17,136	3,831	53,634	4,306	60,284	1,880	26,320
15	68	1,020			28	420		
16	6,180	98,880	9,276	148,416	1,042	16,672		
17			636	10,812				
18			5,643	101,574			2,214	39,852
20	1,079	21,580	4,471	89,420	1,362	27,240		
22			823	18,106	9,109	200,398	134	2,948
24	3,176	76,224	3,069	73,656	26	624		
25			304	7,600				
26			126	3,276	280	7,280		
28	2,227	62,356					87	2,436
30	53	1,590	313	9,390				
32	77	2,464	515	16,480	1,002	32,064		
36	3,854	138,744	26	936	125	4,500		
38							193	7,334
40			1,589	63,560				
44	446	19,624						
48			749	41,944				
58	7	406						
64	106	6,784	176	11,264				
70			53	3,710				
72			118	8,496				
82			35	2,870				
Total	1,025,964	4,855,163	866,839	3,944,883	81,187	658,597	81,871	616,208

Number of ducts.	Western Union Telegraph Co.		Postal Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	515	515	13,831	13,831	160,007	160,007
2	4,262	8,524	1,126	2,252	523,616	1,047,232
3	6,975	20,925			13,337	40,011
4	9,729	38,916	35,428	141,712	853,266	3,413,064
5	4,177	20,885			4,177	20,885
6	4,232	25,392	17,313	103,878	196,657	1,179,942
7					111	777
8			1,140	9,120	204,359	1,634,872
9					7,439	66,951
10	183	1,830			39,600	396,000
11	258	2,838			258	2,838
12			283	3,396	79,862	958,344
13	309	4,017			895	11,635
14					11,241	157,374
15	44	660			140	2,100
16					16,498	263,968
17					636	10,812
18					7,857	141,426
20	160	3,200			7,072	141,440
22					10,066	221,452
24					6,271	150,504
25					304	7,600
26					406	10,556
28					2,314	64,792
30					366	10,980

TABLE No. 18.—*Summary of electric conduits laid from Mar. 27, 1900, to July 1, 1919*—Continued.

Number of ducts.	Western Union Telegraph Co.		Postal Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
32					1,594	51,008
36					4,005	144,180
38					193	7,334
40					1,589	63,560
44					446	19,624
56					749	41,944
58					7	406
64					282	18,048
70					53	3,710
72					118	8,496
82					35	2,870
Total	30,844	127,702	69,121	274,189	2,155,826	10,476,742

This table does not include 14,598 feet of United States Government conduit and 660.6 feet of private conduit.

TABLE No. 19.—*Electric conduits, lengths laid each year to July 1, 1919.*

Fiscal year.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Rwy. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Laid prior to Mar. 27, 1900	343,885	1,813,866	79,920	698,920	48,218	399,851	75,743	569,332
1901	16,387	65,952	876	4,690			88	704
1902	8,098	89,958						
1903	24,655	105,592	123,604	640,448				
1904	15,635	65,412	35,905	138,649				
1905	13,798	56,892	39,409	147,002			4,670	37,360
1906	50,057	287,311	80,433	278,683				
1907	38,053	252,741	75,110	281,405	5,285	29,652		
1908	39,705	154,940	58,005	228,725	23	92		
1909	58,607	235,224	45,919	172,768	11,769	90,660	859	6,644
1910	46,096	159,422	56,582	140,859	263	1,788	420	1,804
1911	56,029	240,518	44,822	297,752	913	6,318		
1912	63,841	336,353	19,966	45,697	9,417	58,548	42	168
1913	39,883	146,117	22,980	64,630	2,300	18,400		
1914	45,018	170,578	24,391	51,778			34	136
1915	35,488	130,400	19,059	48,938				
1916	40,894	164,136	16,847	35,513	1,230	37,254	15	60
1917	31,547	115,964	32,645	118,132	142	2,384		
1918	30,374	161,434	54,854	326,322	1,534	12,892		
1919	27,914	102,263	35,512	223,972	93	758		
Total	1,025,964	4,855,073	866,839	3,944,883	81,187	658,597	81,871	616,208

TABLE No. 19.—*Electric conduits, lengths laid each year to July 1, 1919*—Contd.

Fiscal year.	Western Union Telegraph Co.		Postal Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Laid prior to Mar. 27, 1900	.....	.....	14,063	18,944	562,429	3,500,913
1901	.....	.....	.....	.....	17,351	71,346
1902	.....	.....	.....	.....	8,098	89,958
1903	.....	.....	.....	.....	148,259	746,040
1904	.....	.....	.....	.....	51,540	204,061
1905	.....	.....	.....	.....	57,877	241,254
1906	10,635	44,995	.....	.....	141,125	610,989
1907	383	1,710	.....	.....	118,831	555,508
1908	11,463	51,775	.....	.....	109,196	435,532
1909	2,322	7,515	.....	.....	119,476	512,811
1910	329	652	.....	.....	103,690	394,525
1911	.....	.....	531	531	102,295	545,119
1912	.....	.....	50,238	232,992	143,504	673,758
1913	.....	.....	2,915	15,704	68,078	244,851
1914	607	1,214	.....	.....	70,050	223,706
1915	763	1,474	410	2,460	55,720	183,272
1916	986	3,153	361	3,558	60,330	243,674
1917	355	526	.....	.....	64,898	237,006
1918	.....	.....	.....	.....	86,762	500,648
1919	3,007	14,688	.....	.....	66,526	341,681
Total	30,844	127,702	69,121	274,189	2,155,826	10,476,652

TABLE No. 20.—*Gas mains, laid by sizes, July 1, 1918, to July 1, 1919.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	*Linear feet.*	*Linear feet.*
2-inch	667	410	1,077
4-inch	4,060	2,583	6,643
6-inch	7,292	2,202	9,494
8-inch	3,428	.....	3,428
12-inch	2,908	.....	2,908
16-inch	371	.....	371
20-inch	52	.....	52
Total	18,778	5,195	23,973

TABLE No. 21.—*Gas mains, laid by sizes, July 1, 1907, to July 1, 1919.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	*Linear feet.*	*Linear feet.*
1½-inch	9,298	3,120	12,418
2-inch	6,873	1,895	8,768
2½-inch	.....	620	620
3-inch	5,983	.....	5,983
4-inch	225,804	45,547	271,351
6-inch	265,257	62,350	327,607
8-inch	17,224	32,688	49,912
10-inch	5,493	4,107	9,600
12-inch	78,644	38,638	117,282
16-inch	7,330	234	7,564
20-inch	10,747	.....	10,747
24-inch	9,778	.....	9,778
30-inch	459	.....	459
Total	642,890	189,199	832,089

TABLE No. 22.—*Gas mains, lengths laid by years, July 1, 1907, to July 1, 191*

Fiscol year.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	*Linear feet.*	*Linear f*
1907	36,605	8,450	45
1908	61,642	19,777	81
1909	83,692	25,498	109
1910	69,237	2,202	71
1911	48,192	10,983	59
1912	88,583	50,178	138
1913	61,234	11,688	72
1914	48,475	5,839	54
1915	45,274	14,415	59
1916	29,577	24,940	4
1917	19,779	5,864	2
1918	31,822	4,170	3
1919	18,778	5,195	2
Total	642,890	189,199	83

REPORT OF THE MUNICIPAL ARCHITECT.

WASHINGTON, D. C., *September 20, 191*

SIR: I have the honor to forward herewith the tenth annual report of office of the municipal architect for the fiscal year ending June 30, 1919.

During the year eight buildings were under construction, as follows:

Building.	Appropriation available.	Cost.	Comple or to b complet
Fish wharf and market, Water Street, between Eleventh and Twelfth Streets SW	Mar. 3, 1915	$116,476.77	June 1,
Lumber for sheds		658.00	Apr. —,
Improvements on buildings adjoining		360.00	June 10,
Electric lighting fixtures, etc		1,000.00	June 3,
Removal of old structures		100.00	July 11,
Extra allowance for pipe covering		226.98	
Structural steel for shuckers' shed		278.00	Aug. 8,
Construction of cold-storage room		5,975.60	Oct. 4,
Changing gas piping in 25 stores		87.50	
Equipment for cold-storage room		1,236.00	Do.
Construction of pump house		750.00	Sept. 8,
Wharf flushing system		2,788.00	Oct. 20,
Elizabeth V. Brown School, No. 113, Connecticut Avenue, between McKinley and Northampton Streets NW	Sept. 1, 1916	67,972.86	Sept. 7,
Moving boilers from Tenth Street wharf to site		175.00	
Installing B. & W. boilers		320.00	
Water radiators		379.85	
Radiator and drip traps		300.00	
Steam-heating system		4,700.00	Aug. 5,
Heating equipment and materials		1,363.31	
Woodburn School, No. 101, addition for toilets, Riggs and Blair Roads, Woodburn	Sept. 1, 1916	5,500.00	Oct. 1,
Benning School, No. 48, addition for toilets, Anacostia Road, between Benning Road and F Street NE	do	6,000.00	Do.
Foundry addition to McKinley Manual Training School, No. 130, Seventh Street and Rhode Island Avenue NW	do	8,719.19	Aug. 17,
Phelps School, No. 57, pavilion, Vermont Avenue, between T and U Streets NW	(1)	2,997.00	Do.
Portable school buildings	Aug. 31, 1918	135,000.00	Jan. 17,
Furnaces		3,090.00	
Blackboards		1,516.76	Feb. 21,
Head house and sheds on wharf used by the Norfolk & Washington Steamboat Co., Water Street at foot of Seventh Street SW	July 1, 1918	48,252.51	Sept. 25,
Heating system		1,965.00	Sept. 1,

[1] Community forums and civic centers, 1918.

Specifications and proposals were prepared for the following improvements:

Building.	Work.	Date of advertisement.
District of Columbia jail, hospital kitchen	Hood over range and cooking apparatus	July 10, 1918
Elizabeth V. Brown School	Heating system, old building	July 12, 1918
McKinley Manual Training School	Repairs to boiler	July 15, 1918
Truck house No. 1, and engine house No. 9.	Placing grilles in doors	July 23, 1918
Miner Normal School	Overhauling thermostatic system	July 30, 1918
McKinley Manual Training School	Repairs to 2 boilers	Aug. 2, 1918
New Central High School	Extension furnace stack and capping with ventilator.	Aug. 5, 1918
McKinley Manual Training School	Cupola for foundry	Do.
Elizabeth V. Brown School	New heating and ventilating system	Aug. 6, 1918
New Central High School	Machine shop equipment	Do.
District of Columbia workhouse	One steel and 1 radial brick stack	Aug. 26, 1918
Smallpox hospital	Retubing two boilers	Aug. 29, 1918
Peabody School	Retubing boiler	Do.
New Central High School	Installing toilets under stadium	Do.
Elizabeth V. Brown School	Installation of boilers	Aug. 30, 1918
District of Columbia workhouse and reformatory.	Erection 2 radial brick stacks	Sept. 14, 1918
Elizabeth V. Brown School	Installation 3 water radiators	Sept. 19, 1918
Portable school buildings	Erection 20 buildings	Sept. 20, 1918
Elizabeth V. Brown School	Completion of plumbing and electrical work	Sept. 30, 1918
Fish wharf and market	Changing gas piping in 25 stores	Oct. 19, 1918
District of Columbia workhouse and reformatory.	Installation of piping for central power and ice plants.	Oct. 24, 1918
Portable school buildings	Installation blackboards for 20 buildings	Oct. 30, 1918
Do	Installation ventilating furnaces, for 20 buildings.	Do.
Engine house No. 10	Steam heating system	Nov. 8, 1918
Engine house No. 12	do	Do.
Dunbar High School	Installation of ash hoist	Dec. 3, 1918
Portable school buildings	Installation of blackboards for 20 buildings	Dec. 6, 1918
Do	Installation of ventilating furnaces for 20 buildings.	Do.
Elizabeth V. Brown School	Installation of radiator and drip traps	Dec. 10, 1918
Dunbar High School	Installation of dark room vent stack	Do.
Emery School	Retubing water grate	Dec. 12, 1918
New Central High School	Restoration of broken marble newel	Dec. 17, 1918
Elizabeth V. Brown School	Installation heating system	Dec. 27, 1918
Wilson Normal School	Installation of 2 cast-iron lanterns and standards.	Jan. 11, 1919
Dunbar High School	do	Do.
Harbor patrol	Repairing wharf	Jan. 17, 1919
Headhouse for Norfolk & Washington Steamboat Co.	Construction	Feb. 7, 1919
District of Columbia repair shop	Slag roof for shed in storage yard	Feb. 17, 1919
Petworth School	Construction of building	Feb. 20, 1919
Industrial Home School	Setting slate treads	Feb. 27, 1919
Cardozo playground	Construction swimming pool	Mar. 10, 1919
Reservation No. 126 playground, Virginia Avenue and Tenth Street SE.	do	Do.
McKinley Manual Training School	Stack and cupola for foundry	Mar. 26, 1919
Dental clinics, at Curtis, Cleveland, and M Street High Schools.	Electrical work	Apr. 9, 1919
Elizabeth V. Brown School	Installation blow-off valve	Apr. 22, 1919
McKinley Manual Training School	Cupola for foundry	Apr. 28, 1919
Headhouse for Norfolk & Washington Steamboat Co.	Heating system	May 7, 1919
Schools	Repairs to furnaces	May 8, 1919
Elizabeth V. Brown School	Equipment for heating system	May 12, 1919
Schools	Repairs to furnaces	May 20, 1919
Towers School	Hot-air furnaces	May 29, 1919
Bradley School	do	Do.
Blake School	do	Do.
Magruder School	do	Do.
Fish wharf and market	Construction of pump house	June 12, 1919
Dunbar High School	Installation laboratory equipment	June 19, 1919
Fish wharf and market	Refrigerating equipment for cold-storage room	June 26, 1919
Do	Construction of cold-storage room	Do.

CUBIC COST OF BUILDINGS.

In the annual reports of previous years, tables have been submitted showing the cubic cost of buildings erected since 1896. The following table shows cost of buildings erected last year and now under construction.

Comparison in cost of Washington school buildings and repairs with cost in other cities for buildings of similar materials and construction, shows most favorably for this city.

Building.	Cost.	Cubic contents.	Cost per cubic foot.	Heating system.
40 portable school buildings	$156,000	887,200	$0.176	Furnaces.
Head house used by the Norfolk & Washington Steamboat Co., Water Street at foot of Seventh Street SW.	28,842	149,850	.19	Steam.

INCREASE IN COSTS.

Increase in cost of buildings is shown by comparison of the Norfolk & Washington head house, on the water front, with the fire-boat house, a short distance away. The head house is now being built at a cost of 19 cents per cubic foot. The fire-boat house was built in 1907 at a cost of 10.3 cents per cubic foot, and the latter is plastered throughout and trimmed and finished in better materials than we could afford at the head house.

RETARDATION OF WORK DURING THE WAR.

We were impressed by the necessity for the concentration of energy on war projects and the suspension of all work tending to interfere in any way with the necessary preparations to meet the emergency. The commissioners recognized the exigency by issuing orders classifying work according to the pressing public necessity and deferring all work that was not urgently required.

The President of the United States, through the Bureau of Education, advised that the educational equipment should be kept up in such a way that no child should suffer the loss of his schooling either during or following the war. We made great efforts to maintain the school buildings in usable condition and to provide for needed improvements and extensions, notwithstanding the abnormal conditions which retarded work of all kinds and especially construction and repairs, where skilled and unskilled labor was indispensable. The difficulties which confronted us may better be appreciated by calling attention to a few concrete examples:

This office lost 40 per cent of its force by transfer to Federal departments requiring technically trained men for war work. The repair division, which now has about 200 men, dropped down to 80 laborers and mechanics. At times the common or unskilled labor dropped so low and the organization was so unbalanced that the skilled labor and mechanics could not work. The Council of National Defense, through the War Industries Board, shut off the supply of building materials, and it was impossible to obtain steel, lumber, heating apparatus, hardware, or sheet metals. One short length of pipe, needed to complete some work which had been started before the war, had to be brought from Philadelphia by autotruck. Anticipating such a condition in the building business, Congress made a special appropriation for 60 portable school buildings, to be erected during the war and to take the place of permanent school buildings which could not be erected because of the scarcity of labor and materials. But the War Industries Board even refused to allow shipment of materials for these temporary buildings. After repeated efforts, extending over three months, and near the close of the war, they finally agreed to allow us to put up not more than 20 portable school buildings. Application was made for permission to obtain about 150 tons of reinforcing steel for the Municipal Hospital, but the Priorities Board would not allow it to be shipped even for a hospital. Machinery was needed to equip the shops at the New Central High School, and promises were made by the Shipping Board that permission would be given to ship it to the school. But the War Industries Board wrote to the contractor and informed him that it might be shipped if complete in all respects; but that if any part had to be made they would refuse permission. Nothing could be done until after the signing of the armistice to complete the educational equipment of this new school building.

The most striking example of the difficulties encountered in building construction during the war is afforded by the Chevy Chase School, as this work was advertised two days before war was declared, and extended through the trying period when men and materials were hard to obtain. At that time prices had begun to advance, and bids for heating the building exceeded the amount available. An excellent boiler was obtained from a Government building, but great difficulty was experienced in obtaining bids to haul it to the Chevy Chase School. After several months' delay, it was delivered about

August 20, 1917. Bids were then solicited for the boiler parts and attachments necessary to install the boilers in the new position, but no bids could be obtained as all boiler makers were engaged on war work, and not until six months later could we obtain proposals for these boiler parts. They were ordered in January, 1918, and were not delivered until six months after the order had been placed, or in June, 1918. After the receipt of these boiler parts, and 16 months after the work was first advertised, we again advertised for proposals to install the boilers and the heating apparatus; but by this time prices had advanced so rapidly that the lowest bid exceeded the balance of the appropriation, notwithstanding that $15,000 additional had been appropriated; so that nearly 18 months after the work was first advertised, the municipal architect was directed to install the heating plant by day labor and subcontracts. The next difficulty was experienced in obtaining bids for lowering the boilers into position in the boiler room. The contractors, who have the appliances for such work, were so busy with Government war work that they would not give us a reasonable figure for this work, so this was done by employees of the District of Columbia repair shop inexperienced in the work. We then found that no steamfitters could be had to set the boilers, as all were employed on the temporary Government buildings, and that no bricks for setting the boilers could be purchased, and none had been made during the year at Occoquan. We therefore tore down an old building to get bricks to set the boilers. In October, 1918, the manufacturers of the boilers sent a boiler maker from Philadelphia to set up the boilers.

The priorities committee of the War Industries Board refused to permit the shipment of radiators, and it was then necessary to dismantle a vacant school building in order to obtain the necessary radiation for this work. We then found it impossible to get steamfitters, as they would not work on the eight-hour basis when they could obtain Federal Government work on 10 and 12 hours' pay, while District work was limited by law to eight hours per day. In December, 1918, after the signing of the armistice, we were able to make a contract for the installation of this work. These are fair samples of the delays and difficulties experienced in all work undertaken during the war. At the McKinley Manual Training School, where we built a new foundry, the same impediments were met, and even some of the contractors who were induced to submit bids, stated frankly, in their proposals, that the prices were too high, but that they were compelled to protect themselves in the face of advancing wages and scarcity of labor. One bidder stated that his proposal was twice as much as prewar prices, and advised that the work be postponed.

I quote from letters of contractors, showing the difficulty in getting materials shipped into Washington during the war:

"We are extremely sorry we have been unable to apply the asphalt damp-proofing on the floor of the Chevy Chase School before this and have been trying for three months to get the shipment of asphalt into Washington, but owing to the embargo it has been impossible to do so. We finally succeeded in getting it to Philadelphia by rail and from Philadelphia to Baltimore by boat from which point we loaded it on the electric line and understand it is now in Washington but not placed so that we can get to the car."

and their experience in obtaining sufficient labor:

"* * * The entrance of our country into a state of war shortly after we were awarded this contract affected the labor situation very materially so that both skilled and common labor left practically all private work to go on the Government undertakings. As we were permitted to work only eight hours per day, limiting the amount the men could earn, while on Government work they were not so restricted, they were able to earn twice if not more the amount it was possible with us. When this rush period was over we were into the winter months and on account of exceedingly cold weather it was not possible to get the building closed in so that the work could be pushed to completion. The continued war conditions made it impossible for us to secure sufficient common labor to complete the excavation as anticipated, consequently about four and a half months were consumed in moving about 2,900 cubic yards of earth. * * *."

In the commissioner's order of June 19, 1917, it is required that "all departments" will submit, on or before June 1, list of repairs for the premises they occupy. This is seldom complied with. This list is then to go to the municipal architect for estimates and amplification, if necessary. These lists are then to be returned to the heads of departments, "who will make lump-sum allotments to the municipal architect from their proper appropriations." It

has been found impossible to obtain lump-sum allotments in sufficient amount to care for the necessary repairs, and most of the departments send in separate or individual requests at "any time the spirit moves them," and demand special estimates on each request, and then make allotments accordingly through the year and generally near the end of the fiscal year. When all other expenditures have been met, the balance, large or small, is turned over to the superintendent of repairs too late to do the work before the expiration of the fiscal year. A reallotment is required about January 1, "for the last six months of the fiscal year, the head of the department, not the municipal architect, being given an opportunity to increase or decrease the allotment," and "when the head of a department has surplus funds on hand, he may increase the allotment to the municipal architect and may state the purpose for which such funds are to be used."

It will be seen from these provisions: (1) The repair lists are made by heads of departments, and not by the municipal architect or superintendent of repairs, (2) that the head of a department may increase or decrease allotments in the middle of the fiscal year, and (3) that near the close of the fiscal year the head of other departments may turn over "surplus funds," and stipulate how they shall be spent in repair and improvement of the buildings. This works as a hardship on the superintendent of repairs, as he has no repair lists that may be depended upon for continuous operations. He does not know how much will be allotted from time to time, and can not plan in advance for the proper and economical expenditure of the funds. And worst of all he must accept the funds and make such repairs as the heads of other departments may direct. Here we have the head of one department, charged by law with the duty of constructing and repairing all District buildings, subject to the directions of another and coequal head of a department, charged by law with totally different duties, as to the manner and means by which the former shall perform his prescribed duties.

On October 11, 1916, the commissioners appointed an assistant engineer for the purpose, as expressed by the Engineer Commissioner, "that the best administrative results would be secured by taking on an additional employee and giving him supervision over the repair work." After about 18 months' experience in the repair shop, this official submitted the following report:

"The responsibility for the condition of buildings at present is upon the head of the departments (E. D. No. 130674, second indorsement, Feb. 2, 1916). This is certainly an incongruous policy, for it makes the doctor, social worker, schoolmaster, policeman, fireman, etc., responsible for something entirely without his sphere, and sets aside the professional opinion and experience of the architect, engineer, and those skilled in the construction and repair of buildings. Appropriations, as now made by Congress for each department, include money for repairs, personal services, and a host of other items, ranging from the purchase of coal to the running of an automobile, with no specific amount allotted for repairs of buildings and equipment. This combination of making the head of the department responsible for the condition of the building and no definite amount specified for repairs allows the head of the department to expend as little as he desires on the repair items, and the buildings as a result, are depreciating at an unwarranted rate. Under the order of June 19, 1917, the head of the department has a very considerable control over the allotment made to the repair shop (see par. 8) which should not be, as it is possible for the allotment to be decreased by the head of the department in order to care for other activities, the condition of the building suffering accordingly."

The 160 schools, 58 portables, 12 police stations, 38 engine houses, and the police court have special appropriations for repairs. All other District buildings, about 100 in number, have no special appropriations for repairs and must now be kept up by the allotments above mentioned from appropriations for maintenance or contingent funds. A very conservative estimate of the average amount needed for repair of these hundred buildings is $300 per building per annum. I would recommend that an appropriation of $30,000 be made to cover the repairs on all District buildings, not now provided for by special appropriations for repairs, and that the $10,000 heretofore appropriated for District buildings when damaged by fire, be appropriated in this amount each year as an annual appropriation. At the present time there are no funds with which to repair buildings damaged by fire, and the law prohibits insurance. Any

unused balance on this appropriation would be covered into the Treasury at the end of the fiscal year.

RECOMMENDATIONS IN ANNUAL REPORTS.

I beg to refer briefly to recommendations made in previous reports. I feel that many of the recommendations "for changes in the service deemed advisable," however meritorious, are frequently lost in the mass of statistical records necessary in such reports, and others can not be put in practice without appropriations to make them effective. I believe, as the Commission for Consolidation of Schools, that provisions for the physical extension and equipment of buildings should be made by those who are responsible for the planning and construction of the buildings. I also believe that the actual conditions in and about the buildings and the needs and requirements are better understood by those who have had charge of the planning and construction of the buildings for many years than they are by those who have temporary direction over the use of the buildings. I am confident that the former have more reliable data relating to the buildings and the needs and purposes of the buildings than the latter possess. I have felt it my duty to make such recommendations as I believe to be in the interest of economy and improvement in the service, although the initiation of such reforms and improvements may depend upon the cooperation of other departments.

In the annual report of 1910 I should like to call attention to the paragraph on the "time to make repairs." To the recommendation for "central heating plants," "to the use of portables," "for open-window schools," instead of interfering with the mechanical ventilation in permanent buildings; to the paragraph relating to unilateral and bilateral lighting; to remarks on "removal of ashes and rubbish," from District buildings, and to the committee report to Congress including this subject; to the statutory requirement that janitors shall assist in making minor repairs; to the limitation ($100,000) of expenditures for personal services in proportion to the amount of work under construction, or else on a per cent limitation instead of an arbitrary sum which bears no relation to the amount of work that must or can be done during the fiscal year. In the report of 1911 it is shown that the services of inspectors at that time was 1.54 per cent of the cost of buildings then under construction. While the wages of inspectors and draftsmen have increased about 50 per cent since that time, the cost of buildings, due principally to an advance of about 100 per cent in laborers' and mechanics' wages, has also increased accordingly, so that a limitation allowance of 1.5 per cent on the cost of the work for inspection, and 1.5 per cent for draftsmen, copyists, and other per diem employees would probably meet the needs.

In the 1913 report I would invite attention to paragraph under "Heating plants and fuel," which shows the very careful survey of consumption of fuel in the school buildings, the arrangements for using a cheaper grade of coal in down-draft, smokeless boilers, and the saving effected by the first central heating plant, which serves three school buildings. In the 1914 report, under this heading, a saving of $12,000 a year is shown as the result of the central plant with the changes in heating apparatus to adapt them to the use of soft coal.

In the 1917 report I would invite attention to the paragraph dealing with the rapid advance in the cost of buildings between the time the estimates were prepared and the appropriations were made available. The proposals for 11 buildings overran the appropriations, and most of the buildings were constructed by this office with day labor.

I would like to renew certain recommendations in the 1918 report, which shows the difficulties in doing work during the war and the increase in cost of buildings which has reached an advance of 100 per cent with no prospect of reduction within the next year.

I invite attention to that part of the 1918 report relating to a Government commission of competent engineers or heating experts to settle the controversy over the "open-window" method versus mechanical ventilation. If the former method is satisfactory, we are not justified in spending $150,000 a year in ventilating systems. I commend the report of our heating, ventilating, and sanitary engineer in the 1918 report, and again recommend early action by the commissioners on this question.

REPORT OF THE SUPERINTENDENT OF REPAIRS.

I submit herewith the report of the superintendent of repairs, showing the expenditures for repairs on all buildings belonging to the District. Formerly this report was made to show the cost of separate items of labor, materials and contracts for each building, and the books are kept in such a way at the repair shop that a statement in detail can be given when required. But a detailed statement of cost for each of the 300 buildings was considered too voluminous to include in this annual report.

Since July, 1914, the repair lists for the schools, in accordance with the commissioners' orders, have been prepared by taking the requests for repairs as they come from the board of education and estimating on each item, and adding only such items as appear absolutely necessary for the preservation of the buildings. These requests, in the first instance, emanate from the teachers, through the principals, to the supervisor of the school division, and then to the assistant superintendent of schools. He then sends them, through the secretary of the board of education, to the municipal architect. The lists, after approval, become a working schedule.

Questions have been raised lately, by teachers or others in the colored schools, as to their share in the expenditure of repair funds. I must confess that this office, before such a question was raised, did not know what proportion of the funds had been spent on colored schools, as no distinction of any kind had been made either in the preparation of repair lists or in the bookkeeping which would show the relative expenditure on white and on colored schools. I have a statement of these expenditures for the past five years, as follows:

Fiscal year ending June 30, 1915:	
Public schools, repairs to buildings—	
White schools	$60,483.22
Colored schools	20,925.05
Total	81,408.27
Fiscal year ending June 30, 1916:	
Public schools, repairs to buildings—	
White schools	68,945.12
Colored schools	22,822.46
Total	91,767.58
Fiscal year ending June 30, 1917:	
Public schools, repairs to buildings—	
White schools	88,573.80
Colored schools	37,793.48
Total	126,367.28
Fiscal year ending June 30, 1918:	
Public schools, repairs to buildings—	
White schools	86,500.51
Colored schools	33,044.72
Total	119,545.23
Fiscal year ending June 30, 1919:	
Public schools, repairs to buildings—	
White schools	123,867.74
Colored schools	55,630.59
Total	179,498.33

In the count made of pupils in actual attendance, we found that in the 7 high schools there are 6,209 pupils, of whom 1,286 are colored and 4,923 white. In the graded schools, there are 38,693, of whom 11,187 are colored and 27,506 are white. If the total amount expended in repairs, in five years, is divided by the total number of pupils, counted as present at one time, it would represent

an expenditure of $14.044 per pupil, in five years. If the amount expended in repairs on white schools, in five years, $452,053.21, is divided by 32,429 white pupils, counted as present at one time, it would be at the rate of $13.939 per white pupil, or less than the general average. If the amount expended for colored schools, in five years, $178,560.57, is divided by the 12,473 colored pupils present at one time, it would be at the rate of $14.315 per colored pupil, or above the general average, and above the amount spent for each white pupil.

REPORT OF THE CONSTRUCTING ENGINEER AT THE DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY.

This report covers the operations at the workhouse and reformatory and gives the cost of work as accurately as possible under the system of bookkeeping used at the workhouse. I am advised that the system has been changed and that hereafter the constructing engineer may be able to obtain the necessary data from the books of the institution to give accurate statements of cost and show the charges to the several appropriations.

TABLE SHOWING SALARIES IN OTHER CITIES IN COMPARISON WITH SALARIES IN THIS OFFICE.

I append hereto a table prepared for the Commission on Reclassification of Salaries, showing the pay for similar positions and similar duties in 30 other cities. It will be noticed that in many other cities the architectural work is done by private architects, on a percentage commission, under the supervision of the city or school architect, while in this city most of the work is done by the municipal architect, or architects who are employed to assist in the preparation of plans at a reduced percentage for partial services only. I beg you to consider favorably the increase in salaries for this office force and that of the repair shop. I feel that they are absolutely necessary for the District's interest in maintaining a proper organization and gradation of employees. At present some of the subordinate employees are receiving more than those in higher and more responsible positions.

Respectfully submitted.

SNOWDEN ASHFORD,
Municipal Architect.

ASSISTANT TO ENGINEER COMMISSIONER.

Public schools, District of Columbia, 1919, repairs to buildings.

Appropriation		$175,000.00
Credit by transfers (this includes 10 per cent for supervision)		18,310.87
Stock on hand June 30, 1918		33,979.66
		227,290.53
Expended as follows:		
Carpentering—		
Labor	$21,683.95	
Material	14,534.39	
Tinning—		
Labor	13,767.37	
Material	7,812.31	
Heating—		
Labor	10,597.71	
Material	33,889.93	
Plumbing—		
Labor	6,446.45	
Material	1,832.56	
Painting—		
Labor	14,242.48	
Material	4,899.03	
Glazing—		
Labor	1,796.84	
Material	1,402.52	

Expended as follows—Continued.		
Steam fitting—		
Labor	$3,920.31	
Material	1,022.21	
Grading—		
Labor	5,599.55	
Material	1,073.92	
Gas-engine and electrical work—		
Labor	3,432.62	
Material	1,558.61	
Miscellaneous—		
Labor	15,959.84	
Material	7,872.73	
Gas	97.53	
Electricity	130.16	
Ice	36.26	
Forage	4,836.15	
Coal	395.26	
Car tickets	325.00	
Engineer stables	173.50	
Property yard	25.00	
Cement wharf	100.00	
Blue printing	20.64	
Telephone	13.50	
Stock on hand, June 30, 1919	47,340.04	
Balance	452.16	
		$227,2

Fire Department, District of Columbia, 1919, repairs to engines.

Appropriation		$15,0
Credit by transfers (this includes 10 per cent for supervision)		2
		15,2
Expended as follows:		
Carpentering—		
Labor	$6,.378.95	
Material	2,830.77	
Tinning—		
Labor	596.10	
Material	432.89	
Heating—		
Labor	369.08	
Material	326.35	
Plumbing—		
Labor	894.07	
Material	805.11	
Painting—		
Labor	849.45	
Material	611.32	
Glazing—		
Labor	52.69	
Material	49.08	
Steam fitting—		
Labor	49.50	
Material	39.69	
Grading—		
Labor	174.75	
Material	19.92	
Gas-engine and electrical work—		
Labor	143.67	
Material	73.89	
Gas, pro rata share	6.50	
Electricity, pro rata share	8.70	
Ice, pro rata share	2.42	
Forage, pro rata share	322.41	
Coal, pro rata share	26.35	

Expended as follows—Continued.		
Engineer stables, pro rata share	$120.00	
Property yard, pro rata share	12.66	
Cement wharf, pro rata share	70.00	
Blue printing, pro rata share	.39	
Telephone, pro rata share	6.75	
Balance	.72	
		$15,274.18

Metropolitan police, District of Columbia, 1919, repairs to stations.

Appropriation		$8,000.00
Expended as follows:		
Carpentering—		
Labor	$1,071.50	
Material	476.45	
Tinning—		
Labor	775.84	
Material	914.35	
Heating—		
Labor	453.08	
Material	1,161.74	
Plumbing—		
Labor	682.76	
Material	199.24	
Painting—		
Labor	573.46	
Material	433.01	
Glazing—		
Labor	9.11	
Material	4.35	
Steam fitting—		
Labor	89.86	
Material	56.72	
Grading—		
Labor	14.17	
Material	5.12	
Gas-engine and electrical work—		
Labor	23.62	
Material	18.66	
Miscellaneous—		
Labor	456.96	
Material	120.72	
Gas, pro rata share	4.33	
Electricity, pro rata share	5.80	
Ice, pro rata share	1.62	
Forage, pro rata share	214.94	
Coal, pro rata share	17.56	
Engineer stables, pro rata share	120.00	
Property yard, pro rata share	10.00	
Cement wharf, pro rata share	31.05	
Telephone, pro rata share	6.75	
Balance	47.03	
		8,000.00

Courts, District of Columbia, 1919, repairs to buildings.

Appropriation		$1,200.00
Expended as follows:		
Carpentry—		
Labor	$105.80	
Material	24.56	
Tinning—		
Labor	65.98	
Material	30.42	
Plumbing—		
Labor	146.52	
Material	142.81	

Expended as follows—Continued.		
Labor	$148.15	
Labor	148.15	
Material	88.21	
Steam fitting—		
Labor	89.51	
Material	154.58	
Gas-engine and electrical work—		
Labor	32.41	
Material	13.89	
Stock on hand	146.00	
Unexpended balance	11.16	
		$1,200.00

NOTE.—In addition to the repairs on the various school buildings, police stations, engine houses, and police court this shop did during the fiscal year 1919 $41,549.74 worth of repairs on various buildings under the supervision of other officials of the District government.

Report of inspection of steam boilers, public schools, 1919.

School.	Number of boilers.	High pressure.	Low pressure.	Tested.	Safety blows.	Date of inspection.	Remarks.
Armstrong Manual Training.	4	4	.....	200	110	June 29, 1918	Repaired-fire box sides, furnished new tube tiles, new gaskets, new frame for grate.
Birney	2	2	.....	75	25	.....do.....	Installed new fuse plug, repaired brickwork, cleaned smoke pipe, new gaskets.
S. J. Bowen	1	1	.....	90	40	.....do.....	Repaired fire-box sides, cleaned smoke pipe, new gasket.
Brightwood	1	.....	1	75	25	May 21, 1918	New glass in water column, safety gauge repaired, smoke pipes cleaned, new gaskets.
Brookland	2	1	.....	100	30	June 15, 1918	Replaced defective tubes, cleaned smoke pipe.
Do	.....	.....	1	60	25	.....do.....	
Business High	3	3	.....	180	80	June 20, 1918	New gaskets, repaired fire-box sides, furnished one new dead plate.
Old Central High	4	.....	3	75	20	June 3, 1918	Cleaned smoke pipes, repaired fire-box sides, new gaskets.
Do	.....	1	.....	80	50	.....do.....	
New Central High	4	4	.....	200	120	Sept. 2, 1918	Furnished new parts for stoker, repaired fire-box sides.
Congress Heights	2	2	.....	90	25	July 2, 1918	Cleaned smoke pipe, new gaskets.
Cranch	2	.....	1	75	25	May 23, 1918	New gaskets.
Do	.....	.....	1				
Curtis	2	.....	2	75	25	June 10, 1918	Repaired fire-box sides, cleaned smoke pipes, new gaskets.
Dennison	2	.....	2	75	25	June 6, 1918	Repaired fire-box sides, cleaned smoke pipe, repaired grates, new gaskets.
Dunbar High	3	3	.....	190	110	Sept. 2, 1918	Furnished new gaskets, cleaned smoke pipe.
Eastern High	2	.....	2	90	30	May 25, 1918	Repaired fire-box sides, cleaned smoke pipe, new gaskets.
Emery	2	.....	2	75	20	July 2, 1918	Furnished new gaskets, new tubes in west boiler, repaired brickwork.
Force	2	.....	2	75	25	May 18, 1918	Repaired fire box sides, cleaned smoke pipes, new gaskets.
Franklin	2	.....	2	75	30	Aug. 19, 1918	Repaired fire-box sides, cleaned smoke pipe, new gaskets.
Gales	2	.....	2	75	25	May 31, 1918	Do.

Report of inspection of steam boilers, public schools, 1919—Continued.

School.	Number of boilers.	High pressure.	Low pressure.	Tested.	Safety blows.	Date of inspection.	Remarks.
Garnet	2	.....	2	75	20	June 5, 1918	Cleaned smoke pipe; furnished new set grates, new gaskets; repaired fire-box sides; repaired fire brick in fire box; repaired damper regulator.
Grant	2	2	.....	90	25	Aug. 19, 1918	Repaired fire-box sides, cleaned smoke pipes.
Henry	2	.....	2	75	20	June 3, 1918	Repaired fire-box sides, cleaned smoke pipes, repaired smoke pipes, repaired sewer in rear of boiler.
Jefferson	2	2	.....	60	30	July 11, 1918	Repaired fire-box sides, cleaned smoke pipe, tested steam gauge, repaired steam pump; new gaskets.
Lincoln School	2	.....	2	75	25	June 1, 1918	Repaired fire-box sides, cleaned smoke pipes; new gaskets.
M Street power plant.	2	2	.....	190	110	Sept. 2, 1918	New gaskets; repaired fire-box sides; repaired stoker.
McKinley Manual Training.	6	6	.....	190	80	July 15, 1918	Repaired fire-box sides, cleaned smoke pipes, new gaskets, new tube tiles, repaired crown arches.
Do.	(1)	.....	.....	100	50	.....do.....	
Miner Normal	2	2	.....	160	80	Sept. 2, 1918	Repaired fire-box sides, cleaned smoke pipe, repaired pump and engine.
Park View	2	2	.....	75	40	Aug. 19, 1918	New gaskets.
Peabody	2	.....	2	75	20	May 27, 1918	Repaired fire box sides, cleaned smoke pipes, retubed boiler, new gaskets.
[1] 1 upright boiler.							
Powell	2	2	.....	75	40	Aug. 19, 1918	Cleaned smoke pipes, repaired steam pump, new gaskets.
Seaton	2	.....	2	75	25	May 28, 1918	Repaired fire-box sides, cleaned smoke pipe, repaired safety gauge, new gaskets.
Stevens	2	.....	1	75	20	June 7, 1918	Repaired brickwork, cleaned smoke pipes, new gaskets, replaced some grates.
Do.	.....	.....	1	60	25	.....do.....	
Sumner	2	.....	2	80	25	July 15, 1918	New smoke pipe installed, new gaskets.
Syphax	1	1	.....	100	40	July 11, 1918	Repair fire-box sides, cleaned smoke pipe, tested steam gauge, new gaskets.
Tenley	1	.....	1	75	25	June 14, 1918	Repaired fire-box sides, cleaned smoke pipe, some new grates, new gaskets.
Wallach	2	.....	2	75	20	July 11, 1918	Cleaned smoke pipes, new gaskets.
Webster	2	.....	2	75	20	June 7, 1918	Do.
Western High	4	.....	4	100	15	Aug. 19, 1918	Do.
Wilson Normal	2	2	.....	180	80	.....do.....	Repaired fire-box sides, cleaned smoke pipes, repaired return, new gaskets.

SNOWDEN ASHFORD,
Municipal Architect.

REPORT OF THE CONSTRUCTING ENGINEER AT T DISTRICT OF COLUMBIA WORKHOUSE AND REFOR ATORY.

Following is the constructing engineer's report for the year ending Jun 1919, for the workhouse and reformatory of the District of Columbia.

This year the assistant superintendent began a system of bookkeeping s ing the exact cost of every job of repair and construction but he did no ceive orders to start these records until toward the middle of the year, so his books and those of the constructing engineer do not check on all i However, all prices given in this report for material manufactured here, as the prices for brick, crushed stone, sand, and lumber, also the cost of p labor and teams, per day, are those given by the assistant superintendent w are used in his records for the different jobs.

These prices are as follows:

Brick, per thousand	$
Lumber, per thousand	
Sand, per cubic yard	
Stone, crushed, per cubic yard	
Common labor (prisoners), per day	
Teams (with wagon)	

CONSTRUCTION AND REPAIR WORK AT THE DISTRICT OF COLUMBIA REFORM

REST HALL, OFFICERS' QUARTERS AND HOSPITAL.

Material chargeable to the appropriation:	
Glass	$47.59
Miscellaneous material	7.25
Force account chargeable to appropriation: Hired carpenters	
Total chargeable to the appropriation	
Brick, sand, crushed stone, and lumber:	
Not over 500 brick or 1 cubic yard of sand or crushed stone was hauled from the workhouse wharf to the reformatory per load, so the cost of hauling is (using the assistant superintendent's price of $4 per day per team) $2.67 per 1,000 brick and $1.33⅓ per cubic yard of sand or stone—	
Brick, 10,000, at $14.67 (haul $2.67, brick $12)	$146.70
Sand, 10 cubic yards, at $2.33⅓ (haul $1.33⅓, sand $1)	23.33
Total for material produced on reservation	
Cost of prison labor (using superintendent's price of $0.50 per day:	
Plumbers, 23½ days	$11.75
Painters, 15 days	7.50
Carpenters, 19 days	9.50
Bought material and hired force	134.84
Material manufactured	170.03
Prison labor	28.75

MAIN BUILDING AND BAKERY.

Material chargeable to the appropriation:	
Kitchen range, repairs	132.89
Electrical material	22.78
Miscellaneous material	7.90
Weather strips	7.40
Roofing material for repairs	358.01

Force account chargeable to the appropriation:		
Hired carpenters	$300.00	
Bricklayers and cement worker	18.00	
		$318.00
Cost of prison labor:		
Carpenters, 59 days	29.50	
Bricklayers, 5 days	2.50	
Plumbers, 79½ days	39.75	
Electrician, 2 days	1.00	
Painters, 10 days	5.00	
		77.75
Total cost		924.78

PUNISHMENT CELLS.

Material chargeable to the appropriations:		
Cement	$11.50	
Lime	5.40	
	16.90	
Force account chargeable to the appropriations: Cement worker, 6 days	24.00	
Total chargeable to the appropriations	40.90	40.90
Reported last year	1,324.64	
Total cost of construction chargeable to the appropriations	1,365.54	
Cost of prison labor: Cement workers, 76½ days		38.25
Total cost of work this year		79.15

TOTTEN HOUSE.

Material chargeable to the appropriations:		
Paint	$57.86	
Electrical	58.32	
Miscellaneous material	21.61	
Screens	82.80	
		220.59
Force account chargeable to the appropriations:		
Carpenters, 35 days	140.00	
Bricklayer and cement worker	8.00	
		148.00
Total chargeable to the appropriations		368.59
Quantity of lumber from sawmill unknown.		
Cost of prison labor:		
Carpenters, 67 days	$33.50	
Plumbers, 9 days	4.50	
Electricians, 5 days	2.50	
Painters, 64 days	32.00	
Plasterers, 14 days	7.00	
		79.50
Total cost not including native lumber		448.09

BOILER HOUSE.

Material chargeable to the appropriations:		
Cement	$132.20	
Roofing	2.20	
Contract price of chimney	1,630.00	
Total	1,764.40	

Force account chargeable to the appropriations: Hired cement worker and foreman, 20½ days	$82.00	
Total chargeable to the appropriations	1,846.40	
Credit to the District of Columbia for cement used by the chimney contractors	52.25	$52.25
Actual cost of brick chimney		1,794.15
Brick, sand, crushed stone, and lumber:		
Sand, 11 cubic yards	25.67	
Crushed stone, 16 cubic yards	41.81	
		67.48
Cost of prison labor:		
Excavating, 6 days	3.00	
Concrete work, 100½ days	50.25	
Miscellaneous, 25½ days	12.75	
		66.00
Total cost of chimney		1,979.88

Installation of second boiler.

Material chargeable to the appropriations:		
Cement	$10.30	
Miscellaneous material	65.56	
Roofing	31.90	
Steamfitting material	70.00	
Grates	81.35	
Fire brick	7.00	
Paint	2.90	
		269.01
Force account chargeable to the appropriations:		
Hired carpenters, 2½ days	10.00	
Bricklayer, 15 days	60.00	
		70.00
Total chargeable to the appropriations		339.01
Brick, sand, crushed stone, etc.:		
Brick, 3,000, at $14.67	44.01	
Sand, 6 cubic yards, at $2.33⅓	14.00	
		58.01
Cost of prison labor:		
Carpenters, 4½ days	2.25	
Bricklayers, 26 days	13.00	
Plumbers, 42½ days	21.25	
Blacksmith, 3 days	1.50	
		38.00
Total cost of installing second boiler		435.02
Total cost of installation of heating plant to date—		
Previously reported	1,499.99	
Chimney	1,979.88	
Second boiler	435.02	
	3,914.89	

Repairs to boiler house.

Material chargeable to the appropriations:		
Electrical	17.98	
Plumbing	7.02	
Miscellaneous	2.50	
Fire brick	5.00	
Total	32.50	
Force account chargeable to the appropriations:		
Bricklayer, 8½ days	34.00	
Total chargeable to the appropriations		66.50

Cost of prison labor:		
Carpenter, 1 day	$0.50	
Bricklayers, 100½ days	50.25	
Plumbers, 53 days	26.50	
Blacksmith, 5½ days	2.75	
Painters, 5 days	2.50	
		$82.50
Total cost of repairs		149.00

CONSTRUCTION OF OFFICER'S RESIDENCE NO. 1.

Material chargeable to the appropriations:		
Cement	$26.15	
Lime	68.00	
Plumbing material	502.64	
Lumber	423.30	
Tile	17.00	
Building paper	17.00	
Roofing paper	32.76	
Slaters' nails	8.00	
Electrical	123.36	
Slate	142.94	
Miscellaneous	75.82	
Paint	139.19	
Hardware	69.09	
Sheet iron	8.33	
Total		1,653.58
Force account chargeable to the appropriations:		
Carpenters, 169 days	676.00	
Cement and bricklayers, 27 days	101.25	
Plasterer, 33 days	123.75	
Total		901.00
Total chargeable to appropriations this year	2,554.58	
Reported last year	164.29	
Total cost to appropriations to complete residence No. 1		2,718.87
Brick, sand, crushed stone, and lumber:		
Brick, 19,950, at $14.67	292.67	
Sand, 10 cubic yards, at $2.33⅓	23.33	
Lumber (not reported)	--------	
Total		316.00
Cost of prison labor:		
Carpenters, 474 days	237.00	
Plumbers, 86 days	43.00	
Cement workers and bricklayers, 107 days	53.50	
Common labor, 223 days	111.50	
Electricians, 14 days	7.00	
Painting, 84½ days	42.25	
Plasters, 117 days	58.50	
Total		552.75
Total cost this year		3,403.83
Total reported last year		963.32
Total cost of residence No. 1		4,367.15

WORK ON THE SUPERINTENDENT'S RESIDENCE.

(See also Report of Workhouse.)

Material chargeable to the appropriations:		
Electrical	$41.77	
Paint	91.28	
Miscellaneous	56.70	
Range	56.35	
Tools	10.75	
Cement	47.15	
Lime	18.00	
		$322.00
Force account chargeable to the appropriation:		
Carpenters, 57 days, at $4	228.00	
Bricklayer, 1 day, at $3.75	3.75	
		231.75
Total chargeable to the appropriations		553.75
Manufactured material (*See* Workhouse report).		
Cost of prison labor:		
Carpenters, 137½ days	$68.75	
Plasterer, 1 day	.50	
Stonework, 19 days	9.50	
Electrician, ½ day	.25	
		79.00
Total cost against the reformatory		632.75

POWER LINE TO DISTRICT OF COLUMBIA REFORMATORY.

(*See* Workhouse report.)

Material chargeable to the appropriation:		
Copper trolley wire	$1,219.30	
No force account chargeable to appropriations.		
Total chargeable to appropriations		1,219.30
No manufactured material.		
Cost of prison labor: Electrician, 140 days, at $0.50		70.00
Total cost this year		1,289.30
Reported last year	$414.89	
Previously reported on power and telephone line	3,016.30	
Total	4,720.49	

COTTAGES FOR TUBERCULAR PATIENTS.

Material chargeable to the appropriations:		
Electrical	$0.92	
Miscellaneous	1.53	
		2.45
No prison labor reported.		
Total reported last year		431.65
Total		434.10

MAIN SEWER EXTENSION AND SEPTIQ TANK.

Material chargeable to the appropriations:		
Cement	$116.80	
Lime	19.80	
Miscellaneous	10.28	
Sewer pipe	96.56	
Tools	10.03	
Plumbing material	22.68	
Roofing	2.20	
		278.35

Force account chargeable to the appropriations:		
Carpenters, 37 days	$148.00	
Cement worker and bricklayer, 25½ days	95.63	
		$243.63
Total chargeable to the appropriations		521.98
Manufactured material:		
Sand, 52 cubic yards, at $2.33⅓	121.33	
Crushed stone, 60 cubic yards, at $2.61⅔	160.67	
Brick, M. Hs. 11,000, at $14.67	161.37	
		413.37
Prison labor:		
Labor excavating, 550½ days	275.25	
Concrete work, 691 days	345.50	
Carpenter helper, 6 days	3.00	
Brickwork, 51 days	25.50	
Blacksmith, 3 days	1.50	
Plumbers, 5½ days	2.75	
		653.50
Total cost this year		1,588.85
Previously reported		1,063.91
Total cost to date		2,652.76

SHOPS, WAGON SHED, AND STABLE REPAIRS.

Material chargeable to the appropriations:		
Roofing	$17.60	
Miscellaneous	6.10	
Cement	6.90	
Total	30.60	
Hired force account: Bricklayer, 6 days, at $3.75	22.50	
Total chargeable to the appropriations		53.10
Manufactured material: Brick, 1,500, at $14.67		22.00
Cost of prison labor:		
Bricklayers, 34 days (chimneys)	17.00	
Carpenters, 2½ days	1.25	
Plumbers, 10 days	5.00	
		23.25
Total cost		98.60

WORK ON RAILROAD RIGHT OF WAY.

Material chargeable to the appropriations:		
Plow	$19.85	
Plowshares	7.50	
Spikes	13.00	
Tools	2.32	
Total chargeable to the appropriations		42.17
Cost of prison labor: Grubbing stumps, 29 days		14.50
Total cost	56.67	56.67
Previously reported	3,410.47	
Total cost to date	3,467.14	

REPAIRS TO SCOWS, HOUSE BOAT, AND NINTH STREET WHARF.

Material chargeable to the appropriations: Miscellaneous	$17.68	
Force account chargeable to the appropriations: Carpenters, 20 days, on scows	80.00	
Total chargeable to the appropriations		$97.68
Cost of prison labor: Carpenters, 25½ days		12.75
Total cost		110.43

WORK ON RAILROAD CULVERT IN STONE QUARRY.

(*See* Workhouse report.)

Material chargeable to the appropriations: Cement		$232.35
Force account (*see* Workhouse report).		
Manufactured material:		
Brick, 50,000, at $14.67	$733.50	
Sand, 33 cubic yards, at $2.33⅓	77.00	
		810.50
Cost of prison (*see* Workhouse report).		
Total cost this year		1,042.85
Reported last year		266.33
Total (*see* Workhouse report)		1,309.18

POLLOCK HOUSE.

Material chargeable to the appropriations:		
Slate and nails	$257.46	
Electrical	2.18	
Weather strips	10.20	
Miscellaneous material	13.39	
Sheet iron	19.56	
Slaters' cement	9.30	
Paint	15.39	
		327.48
Force account chargeable to the appropriation: Carpenters, 23 days		92.00
Total chargeable to the appropriations		419.48
No manufactured material used.		
Cost of prison labor:		
Carpenters, 20 days	$10.00	
Painters, 35½ days	17.75	
		27.75
Total cost		447.23

REPAIRS TO WAGON ROADS.

Chargeable to the appropriations: One paid foreman, 1 day	$3.75	
Cost of prison labor: Labor, 589½ days	294.75	
		298.50

FOOTBRIDGE BETWEEN ASSISTANT SUPERINTENDENT'S RESIDENCE AND OFFICERS' HOUSE NO. 1.

Material chargeable to the appropriations:		
Lime, 1 barrel	$1.60	
Nails, 600 pounds	28.34	
		29.94
Lumber sawed on reservation: 1,485 board feet, at $20		29.70
Cost of prison labor: Carpenters and helpers, 100 days		50.00
Total cost of footbridge		109.64

CHANGE IN HEATING TUNNEL.

Material chargeable to the appropriations: Cement and miscellaneous material		$18.00
Cost of prison labor, 17 days		8.50
Total cost		26.50

PHYSICIAN'S RESIDENCE.

Material chargeable to the appropriations:		
Tools	$19.90	
Cement	209.30	
Lime	2.40	
Flooring	153.00	
Lumber	85.20	
Miscellaneous	75.63	
		545.43
Labor chargeable to the appropriations:		
Carpenters, 25 days	100.00	
Plumber, 12 days	60.00	
Foreman, 31 days	155.00	
Bricklayer, 63½ days	254.00	
		569.00
Total chargeable to the appropriations		1,114.43
Manufactured material:		
Brick, 20,000, at $14.67	293.40	
Sand, 38 cubic yards, at $2.33⅓	88.67	
		382.07
Cost of prison labor:		
Carpenters, 20 days	10.00	
Common labor, 397½ days	198.75	
Brickwork, 400½ days	200.25	
		409.00
Total cost		1,905.50

REPAIRS TO SAWMILL.

Material chargeable to the appropriations:		
Tools	$0.28	
Saw	19.50	
Axes	17.40	
Repairs to engine	80.61	
Miscellaneous	2.29	
Total	120.08	
No hired force account.		
Total chargeable to the appropriations		120.08
No manufactured material.		
Cost of prison labor:		
Carpenter, 1 day	0.50	
Blacksmit, 1½ days	.75	
Plumber, 2 days	1.00	
		2.25
Total cost		122.33

BUILDING STONE GATE POSTS AT ENTRANCE TO THE INSTITUTION.

Material chargeable to the appropriations: Cement	2.30	
Cost of prison labor: Bricklayer, 9 days	4.50	
Total cost		6.80

WAGON ROAD TO SITE OF PERMANENT BUILDINGS.

Material chargeable to the appropriations: Tools	$29.80	
Force account chargeable to the appropriations: Foreman, 41 days	164.00	
Total chargeable to the appropriations		$193.80
No manufactured material used.		
Cost of prison labor: Excavating, 421½ days		210.75
Total cost		404.55

PERMANENT BUILDING SITE.

Prison labor, grubbing, 217½ days		108.75

HOUSES ON 10A LOT JUST ACQUIRED.

Material chargeable to the appropriations:		
Nails	7.05	
Roofing	15.40	
		22.45
Hired force account chargeable to the appropriations: Carpenters, 5 days	20.00	
Total chargeable to the appropriations		42.45
Native lumber used not reported.		
Cost of prison labor: Carpenters, 10½ days		5.25
Total cost		47.70

EXPENSES OF THE CONSTRUCTING ENGINEER'S OFFICE.

(See workhouse report.)

Material chargeable to the appropriations:		
Gasoline and oil for Ford truck	70.12	
Repairs for Ford truck	5.90	
Miscellaneous material	7.04	
Total		83.06

MISCELLANEOUS REPAIRS BY PLUMBING SHOP.

Material chargeable to the appropriations:		
Tools	$0.74	
Material	297.46	
Total chargeable to the appropriations		298.20
Cost of prison labor: Plumbers, 366½ days		183.25
Total cost		481.45

REPAIR WORK, GENERAL PAINTING.

Material chargeable to the appropriations:		
Paint, etc	$225.29	
Tools	1.81	
Glass	26.90	
Total chargeable to the appropriations		254.00
Cost of prison labor: Painters, 309½ days		154.75
Total cost		408.75

REPAIR AND GENERAL ELECTRICAL WORK.

(See workhouse report.)

Material chargeable to the appropriations:		
Tools	$17.40	
Electrical material	361.21	
Road lights.		
Cement	4.60	
Miscellaneous	52.12	
Capt. Pettit's telephone installation	19.99	
		$455.32
Cost of prison labor: Electrician		21.00
Total cost		476.32

For labor on road lights, telephone, etc., see workhouse report.

REPAIR WORK, CARPENTER SHOP.

Material chargeable to the appropriation:		
Tools	$5.30	
Electric lamps	.92	
Miscellaneous	14.72	
Roofing (barber shop)	35.20	
Officers' quarters	9.00	
Chicken house	.44	
Hog pens	1.83	
Dog kennels	1.85	
Slaters tools	38.40	
Shed for dump cars. (*See* Workhouse report.)		
Roofing	19.80	
Miscellaneous	1.51	
		128.97
Force account chargeable to the appropriations:		
Carpenters (on general repairs) 4 days	16.00	
Remodeling old rest hall, 12 days	48.00	
		64.00
Total chargeable to the appropriations		192.97
No manufactured material reported.		
Cost of prison labor:		
Carpenters (on hog pens), 14½ days	7.25	
Carpenters (on paint shop), 26½ days	13.25	
Carpenters (on general repairs), 397 days	198.50	
		219.00
Total cost		411.97

REPAIR WORK BY BLACKSMITH.

Material chargeable to the appropriations:		
Iron	$9.68	
Tools	1.13	
Paint	13.14	
Miscellaneous material	95.94	
Total chargeable to the appropriations		119.89
Cost of prison labor: Helpers, 926 days		463.00
Total cost		582.89

REPAIRS TO PUMPING STATION.

(See workhouse report.)

Material chargeable to the appropriations:		
Plumbing material	$13.50	
Fire brick	9.00	
Electrical	1.73	
Miscellaneous	.65	
		$24.88
Appropriation for permanent construction, buildings etc., 1917		45,000.00
Appropriation for permanent construction, buildings etc., 1918		45,000.00
Appropriation for permanent construction, buildings, etc., 1919		35,000.00
Appropriation for temporary quarters, furniture, and equipment		5,000.00
Expended from appropriation for maintenance for paint, lumber pumping supplies, etc., 1917		2,149.89
Expended from appropriation for maintenance for paint, lumber, etc., 1918–1919		1,129.57
Total		133,279.46
Chargeable against the above appropriations:		
Previously reported, actual cost of work done		67,948.58
Rest hall, officers' quarters, and hospital		134.84
Main building and bakery		846.98
Punishment cells		1,365.54
Totten house		368.59
Boiler house—		
Brick chimney		1,846.40
Institution second boiler		339.01
Repairs		66.50
Officers' residence No. 1		2,554.58
Work on superintendent's residence		553.75
Power line		1,219.30
Cottage for tubercular patients		2.45
Main sewer and septic tank		521.98
Shops and wagon shed repairs		53.10
Work on railroad right of way		42.17
Repairs to scows, houseboat, etc		97.68
Railroad culvert in stone quarry		232.35
Pollock house		419.48
Road repairs		3.75
Foot bridge		29.94
Changes in heating tunnel		18.00
Physician's residence		1,114.43
Repairs to sawmill		120.08
Stone gate posts		2.30
Wagon road to permanent site		193.80
House on 10A lot		42.45
Expenses of constructing engineer's office		83.06
Repairs by plumbing shop		298.20
General painting		254.00
General electrical work		455.32
Repair work by carpenter shop		192.97
Blacksmith work		119.89
Repairs to pumping station		24.88
Salary of constructing engineer		1,800.00
Salary of assistant constructing engineer		300.25
Skilled laborers		717.87
Actual cost of work done		84,384.47
Material left on hand in commissary		2,692.57
Salaries, furniture, oils, etc., reported last year as not actual part of construction cost		9,577.75
Oils		81.00
Repairs, not included in report		213.85

Telephone tolls	$0.60
Miscellaneous	10.00
Salaries, not included in actual cost of work	2,460.57
Total chargeable against appropriations	99,420.81
Total appropriations	133,270.46
Actually spent	99,420.81
Remainder of applications	33,858.65

COLD-STORAGE PLANT IN THE COMMISSARY.

No work done this year to be chargeable against this appropriation. Balance unexpended remaining as reported last year, $342.23.

This balance is less than shown on the chief clerk's books, as this report charges against this appropriation wages paid mechanics for work actually done, while, as a matter of fact, the mechanics' wages were paid from some other appropriation.

ENLARGEMENT OF THE CENTRAL POWER PLANT.

(See report for District of Columbia workhouse.)

Material chargeable to the appropriations:		
Cement	$136.19	
Tools	3.01	
Paint	16.17	
Lime	18.00	
Lumber	533.16	
Hardware	8.85	
Glass	102.41	
Feed-water heater	793.00	
Roofing	186.04	
Electrical lamps	1.10	
Miscellaneous	99.59	
Slate and nails	673.80	
Ice plant—		
Iron	64.40	
Miscellaneous	17.09	
Cement	6.65	
		2,659.46
Force account chargeable to the appropriations: Carpenters, 148½ days		594.00
Total chargeable to the appropriations		3,253.46
Manufactured material used: Lumber, 12,000 feet, at $20		240.00
Cost of prison labor: Carpenters, 58½ days		29.25
Total cost this year		3,522.71
Total chargeable to the appropriation this year		3,253.46
Previously reported		33,999.83
Total chargeable to the appropriation to date		37,253.29
Total appropriation		63,000.00
Unexpended		25,746.71
Chief clerk's books gives unexpended as		27,995.14
Difference paid from other appropriation		2,248.43

DISTRICT OF COLUMBIA WORKHOUSE.

Silos.

Material chargeable to the appropriations:		
Cement (foundations for ensilage cutter)	$16.50	
Steel channel	52.00	
Lumber	187.50	
		256.00

Force account chargeable to the appropriations:		
Cement worker, 2½ days	$10.00	
Carpenters, 7½ days	30.00	
		$40.00
Total chargeable to the appropriations		296.00
Manufactured material:		
Sand, 5 cubic yards, at $1.67	8.35	
Stone, 6 cubic yards, at $1.95	11.70	
		20.05
Cost of prison labor:		
Cement work, 29 days	14.50	
Carpenters, 29 days	14.50	
		29.00
Total cost this year		345.05
Reported last year		2,950.57
Total cost of silos		3,295.62

SUPERINTENDENT'S RESIDENCE.

(See reformatory report.)

Material chargeable to the appropriations:		
Electrical	$160.33	
Wall paper	241.90	
Lumber	69.75	
Roofing, felt	68.20	
Slate and nails	473.60	
Paint	231.97	
Glass	2.11	
Plumbing	91.64	
Cement	13.45	
Miscellaneous	50.55	
Tools	4.06	
Screens, doors, etc	157.58	
Molding	18.12	
		1,583.24
Force account chargeable to the appropriations:		
Carpenters, 48½ days	194.00	
Carpenters, 50½ days, at $2.33⅓	117.83	
Bricklayer and plasterer, 3 days, at $4	12.50	
		323.83
Total chargeable to the appropriations		1,907.07
Manufactured material:		
Lumber, 1,200 board feet, at $20	24.00	
Brick, 5,200, at $13.33⅓ ($12 cost brick, $1.335 hauling)	69.33	
Sand, 13 cubic yards, at $1.67 (sand $1, hauling $0.67)	21.71	
Stone, 2 cubic yards, at $1.95 (stone $1.28, hauling $0.67)	3.90	
		118.94
Cost of prison labor:		
Plumbing, 80½ days	40.25	
Painting, 270 days	135.00	
Plastering, 8 days	4.00	
Brickwork, 65 days	32.50	
Blacksmith, ½ day	.25	
Electrical, 9½ days	4.75	
Paper hanging, 10 days	5.00	
Carpenters, 235½ days	117.75	
		339.50
Total cost		2,365.51

ASSISTANT SUPERINTENDENT'S RESIDENCE.

Material chargeable to the appropriations:		
Electrical	$23.85	
Paint	167.26	
Wall paper	125.00	
Nails	3.22	
Pump	9.00	
Range	56.35	
Fly screen	30.40	
Roofing	11.00	
Plumbing	12.17	
Miscellaneous	66.36	
Lumber	167.60	
		$672.21
Force account chargeable to the appropriations:		
Bricklayer, 3½ days, at $4	14.00	
Plastering, 10 days, at $4	40.00	
Carpenters—		
14½ days, at $4	58.00	
40 days, at $2.25	90.00	
		202.00
Total chargeable to the appropriations		874.21
Manufactured material:		
Lumber, 1,200 feet, at $20	24.00	
Sand, 26 cubic yards, at $1.67	43.42	
Brick, 1,000, at $13.33⅓	13.33	
		80.75
Cost of prison labor:		
Brickwork, 18 days	9.00	
Blacksmith, ½ day	.25	
Electrical, 18½ days	9.25	
Plumbing, 34½ days	17.25	
Painting, 185 days	92.50	
Plastering, 68 days	34.00	
Carpenters, 145 days	72.50	
		233.75
Total cost		1,188.71

POLLOCK HOUSE.

(See reformatory report.)

Material chargeable to the appropriations:		
Electrical	$3.66	
Cement	3.00	
Wall paper contract	75.00	
		81.66
Force account chargeable to the appropriations: Cement worker, 2½ days		10.00
Total chargeable to the appropriations		91.66
Manufactured material, none used.		
Cost of prison labor:		
Glazing and sizing walls, 1½ days	$0.75	
Electrical, 2 days	1.00	
Plumbing, 3½ days	1.75	
Cement work, 20 days	10.00	
		13.50
Total cost		105.16

FARMER'S COTTAGE.

Material chargeable to the appropriations:		
Electrical	$0.95	
Lumber	67.10	
Paint	11.50	
Roofing	17.80	
Plumbing	27.40	
Cement	19.50	
Miscellaneous	15.97	
		$160.22
Force account chargeable to the appropriations:		
Brickwork, 8 days	32.00	
Carpenters, 16 days	64.00	
		96.00
Total chargeable to the appropriations		256.22
Manufactured material:		
Brick, 5,000 at $13.33⅓	66.65	
Lumber, 1,000 feet, at $20	20.00	
Sand, 4 cubic yards, at $1.67	6.68	
		93.33
Cost of prison labor:		
Brickwork, 72 days	36.00	
Carpenters, 55½ days	27.75	
Electrician, 2½ days	1.75	
Painters, 6½ days	3.25	
Plumbers, 10 days	5.00	
		73.75
Total cost		423.30

WORK AT THE FEMALE DEPARTMENT.

Material chargeable to the appropriations:		
Electrical	$29.39	
Cement	210.00	
Roofing	6.16	
Paint	15.10	
Motor, laundry	65.00	
Fly screen	85.23	
Plumbing	15.00	
Miscellaneous	24.36	
Lime	36.00	
		486.24
Force account chargeable to the appropriations:		
Carpenters—		
32 days, at $2.25	72.00	
18 days, at $4	72.00	
Bricklayers, 43 days, at $4	172.00	
		316.00
Total chargeable to the appropriations		802.24
Manufactured material:		
Sand, 52 cubic yards, at $1.67	86.84	
Brick, 58,200, at $13.33⅓	776.00	
Stone, 7 cubic yards, at $1.95	13.65	
Lumber, 2,000 feet, at $20	40.00	
		916.49
Cost of prison labor:		
Carpenters, 134 days	67.00	
Electricians, 11 days	5.50	
Painting, 6½ days	3.25	
Plumbing, 95½ days	47.75	
Brickwork, 328 days	164.00	
		287.50
Total cost		2,006.23

REPAIR WORK AT THE DAIRY.

Material chargeable to the appropriations:		
Reinforcing steel for new floor	$79.87	
Cement and lime	23.30	
Miscellaneous material	27.14	
Electrical	.84	
Plumbing	57.49	
Screens, fly	23.20	
		$211.84
Force account chargeable to the appropriations:		
Cement worker, 4 days, at $4	16.00	
Carpenters—		
11 days at $4	44.00	
7 days, at $2.33⅓	16.33	
		76.33
Total chargeable to the appropriations		288.17
Manufactured material:		
Lumber, 2,000 feet, at $20	40.00	
Sand, 10 cubic yards, at $1.67	16.70	
Stone, 20 cubic yards, at $1.95	39.00	
		95.70
Cost of prison labor:		
Electricians, 7½ days	3.75	
Cement workers, 17½ days	8.75	
Plumbers, 15 days	7.50	
Painters, 1 day	0.50	
Carpenters, 116 days	58.00	
		78.50
Total cost (not including the entire cost of replacing the old concrete floor which failed as this work was not completed until after July 1, 1919)		462.37

WORK ON OLD ICE PLANT.

Material chargeable to the appropriations:		
Roofing	$22.00	
Plumbing	17.77	
Electrical	30.74	
Miscellaneous	26.62	
		97.13
Force account chargeable to the appropriations: Carpenter, 1 day		4.00
Total chargeable to the appropriations		101.13
No manufactured material used.		
Cost of prison labor:		
Carpenters, 5 days	2.50	
Plumbers, 11½ days	5.75	
Electricians, 2½ days	1.25	
		9.50
Total cost		110.63

WORK AT THE HOG PENS.

Material chargeable to the appropriations:		
Cement	$63.05	
Lime	25.15	
Roofing	94.64	
Miscellaneous	30.93	
		213.77

Force account chargeable to the appropriations:		
Carpenters, 16 days, at $4	$64.00	
Bricklayers, 23½ days, at $4	94.00	
		$158
Total chargeable to the appropriations		371
Manufactured material:		
Sand, 31 cubic yards, at $1.67	51.77	
Stone, 10 cubic yards, at $1.95	19.50	
Lumber, 12,000 feet, at $20	240.00	
Brick, 20,000, at $13.33⅓	266.67	
		57
Cost of prison labor:		
Carpenters, 139½ days	69.75	
Cement and brickwork, 213 days	106.75	
Excavating, 218½ days	109.25	
Plumber, 29 days	14.50	
Painting, ½ day	.25	
Blacksmith, 2 days	1.00	
		30
Total cost		1,25

REPAIRS TO SCOWS, HOUSE BOAT, TUGS, ETC.

Material chargeable to the appropriations:		
Lumber	$201.29	
Paint	8.50	
Miscellaneous	25.57	
		23
Tug *Louise:*		
Paint	55.71	
General overhauling	477.81	
		53
Tug *General Warren:*		
Chain used to raise *General Warren*	27.50	
Miscellaneous	1.24	
		2
Total cost of bought material		79
Force account chargeable to the appropriations:		
Carpenters—		
1 day, at $4	4.00	
7 days, at $2.33⅓	16.00	
Total	20.00	
Total chargeable to the appropriations		81
Manufactured material—Lumber, 4,000 feet, at $20		8
Cost of prison labor—Carpenters, 24½ days		1
Total cost		90

PRISONERS' KITCHEN AND DINING ROOM.

Material chargeable to the appropriations:		
Paint	$119.18	
Electrical	11.94	
Miscellaneous	11.61	
Total chargeable to the appropriations		14
Manufactured material:		
Sand, 3 cubic yards, at $1.67	5.01	
Lumber, 300 feet, at $20	6.00	

Cost of prison labor:		
Carpenters, 12½ days	$6.25	
Cement work, 2 days	1.00	
Blacksmith, ½ day	.25	
Painters, 94½ days	47.25	
Plumbers, 8½ days	4.25	
		$59.00
Total cost		212.74

REPAIRS TO SAWMILL.

Material chargeable to the appropriations:		
Saw	$3.18	
Tools	5.25	
Miscellaneous	35.83	
Total cost		44.26

REPAIR WORK AT BRICK YARD.

Material chargeable to the appropriations:		
Cement	$14.35	
Roofing	20.24	
Repairs to dry pan	53.85	
Rope	20.50	
Electrical	53.79	
Plumbing	111.53	
General repairs	376.70	
Tools	6.84	
Miscellaneous	97.56	
		755.36
Material (manufactured):		
Sand, 5 cubic yards, at $1.67	8.35	
Lumber, 2,000 feet, at $20	40.00	
		48.35
Cost of prison labor:		
Electricians, 27 days	13.50	
Blacksmith, 1 day	.50	
Plumbers, 20 days	10.00	
		24.00
Most of the work was done by the regular brick plant gang and so was not reported.		
Total cost as reported		827.71

REPAIR WORK AT POULTRY YARDS.

Material chargeable to the apprpriations:		
Roofing	$75.74	
Cement	92.00	
Paint	16.95	
Electrical	1.75	
Miscellaneous	26.92	
		213.36
Force account chargeable to the appropriations:		
Carpenters, 2 days, at $4	8.00	
Cement worker, 7½ days, at $4	30.00	
		38.00
Total chargeable to the appropriations		251.30
Manufactured material:		
Sand, 59 cubic yards, at $1.67	98.53	
Stone, 28 cubic yards, at $1.95	54.60	
		153.13

Cost of prison labor:		
Carpenters, 17 days	$8.50	
Bricklayers, 72 days	36.00	
Plumbers, 3½ days	1.75	
Electricians, 2 days	1.00	
Painters, 7 days	3.50	
		$50.75
Total cost		455.24

REPAIR WORK AT THE BOILER HOUSE.

Material chargeable to the appropriations:		
Cement	$107.25	
Electrical	1.30	
Miscellaneous	9.11	
		117.66
Force account chargeable to the appropriations:		
Cement worker, 4 days, at $4	16.00	
Dismantling boiler for District of Columbia Reformatory	8.00	
Carpenters, 4 days, at $4	16.00	
		40.00
Total chargeable to the appropriations		157.66
Manufactured material:		
Sand, 6 cubic yards, at $1.67	10.02	
Stone, 6 cubic yards, at $0.195	11.70	
		21.72
Cost of prison labor:		
Plumbers and steam fitters, 25 days	12.50	
Cement workers, 52 days	26.00	
Bricklayers, 4 days	2.00	
Electricians, ½ day	.25	
Carpenters, 12 days	6.00	
Removing boiler to District of Columbia Reformatory, 69 days	34.50	
		81.50
Total cost		260.88

NEW CHIMNEY AT THE BOILER HOUSE.

Chargeable to the appropriations:		
Contract price of chimney	$1,630.00	
Cement	94.30	
Miscellaneous material	1.15	
Carpenter on foundation of forms	10.00	
Excavating and concrete work, foreman, 32½ days	16.50	
Total chargeable to the appropriations		1,751.95
To be credited for cement used by the contractor		71.50
Actual cost of stack		1,680.45
Manufactured material:		
Sand, 17 cubic yards, at $1.67	28.39	
Stone, 20 cubic yards, at $1.95	39.00	
		67.39
Cost of prison labor—Excavating and concrete work, 264 days		132.00
Total cost		2,022.84

ENLARGEMENT CENTRAL POWER PLANT.

(See reformatory report.)

Material chargeable to the appropriations:		
Roofing	$209.00	
Electrical	2.80	
Paint	1.06	
Tools	1.19	
Miscellaneous	32.29	
		$246.34
Force account chargeable to the appropriations:		
Bricklayers, 31 days	124.00	
Carpenters, 106½ days	426.00	
		550.00
Total chargeable to the appropriations		796.34
Manufactured material: Reported in the reformatory report.		
Cost of prison labor:		
Bricklayers, 3 days	1.50	
Cement workers, 212 days	106.00	
Carpenters, 616 days	308.00	
Painters and glazers, 20½ days	10.25	
Blacksmith, 3 days	1.50	
		427.25
Grading in front of central power plant: Prison labor, 427 days		213.50
Total cost to workhouse		1,437.09

WORK ON THE CALF SHEDS.

Material chargeable to the appropriations: Roofing	88.50
Force account chargeable to the appropriations: Carpenters, 2 days, at $4	8.00
Total chargeable to the appropriations	96.00
No manufactured material used.	
Cost of prison labor: Carpenters, 10 days	5.00
Total cost	101.00

REPAIR WORK ON THE DAWSON HOUSE.

Material chargeable to the appropriations:		
Cement	$5.85	
Lumber	46.50	
		52.35
Force account chargeable to the appropriations: Carpenters, 3 days		12.00
Total chargeable to the appropriations		64.35
Manufactured material:		
Sand, 3 cubic yards, at $1.67	5.01	
Stone, 2 cubic yards, at $1.95	3.90	
		8.91
Cost of prison labor: Carpenters, 6 days		3.00
Total cost		76.26

REPAIRS TO THE STONE CRUSHER.

Material chargeable to the appropriations:		
Stone screen	$15.02	
Miscellaneous	3.76	
		18.78

Work done by the regular stone-crusher gang so the force account was not reported.

WORK DONE AT THE MESS HALL ON LOWER SITE.

Material chargeable to the appropriations:		
Lime	$5.25	
Plumbing	9.79	
Fly screen	3.68	
Miscellaneous	1.13	
		$19.85
Force account chargeable to the appropriations:		
Carpenters, 24 days, at $4	96.00	
Bricklayers, 42 days, $4	168.00	
		264.00
Total chargeable to the appropriations		283.85
Manufactured material:		
Brick, 2,000, at $13.33⅓	26.67	
Sand, 1 cubic yard, $1.67	1.67	
Lumber, 2,000 feet, at $20	40.00	
		68.34
Cost of prison labor:		
Carpenters, 8 days	4.00	
Bricklayers, 4 days	2.00	
		6.00
Total cost		358.19

REPAIRS TO PUMPING STATION.

(See District of Columbia Reformatory report.)

Material chargeable to the appropriations:		
Pump rods	$50.70	
Miscellaneous material	80.65	
Total cost		131.35

All labor was done by the regular pump house force and so was not reported.

REPAIR WORK ON THE HOSPITAL.

Material chargeable to the appropriations:		
Roofing	$92.40	
Electrical	2.65	
Paint	19.40	
Miscellaneous	3.98	
Fly screens	19.80	
		$138.23
Force account chargeable to the appropriations: Carpenters, 15 days		60.00
Total chargeable to the appropriations		198.23
No manufactured material used.		
Cost of prison labor:		
Carpenters, 60 days	30.00	
Plumbers, 5 days	2.50	
Painters, 2½ days	1.25	
		33.75
Total cost		231.98

REPAIR WORK TO OFFICERS' QUARTERS.

Material chargeable to the appropriations:		
Cement	$83.45	
Fly screen	9.24	
Lime	18.00	
Plumbing	1.00	
Miscellaneous	1.80	
		113.49

Force account chargeable to the appropriations:		
Bricklayer, 10 days, at $4	$40.00	
Carpenters, 1 day, at $4	4.00	
		$44.00
Total chargeable to the appropriations		157.49
Manufactured material:		
Sand, 21 cubic yards, at $1.67	35.07	
Brick, 20,500, at $13.33⅓	273.33	
		308.40
Cost of prison labor:		
Plumbers, 2½ days	1.25	
Electricians, 1 day	.50	
Bricklayers, 95 days	47.50	
Painters, 4½ days	2.25	
Carpenters, 4½ days	2.25	
		53.75
Total cost		519.64

REPAIR WORK ON THE REST HALL.

Material chargeable to the appropriations:		
Cement	$58.50	
Lime	3.80	
Paint	29.00	
Miscellaneous	7.43	
		98.73
Force account chargeable to the appropriations:		
Bricklayers, 9 days, at $4	36.00	
Carpenters, 3 days, at $4	12.00	
Carpenters, 4 days, at $2.33	9.32	
		57.32
Total chargeable to the appropriations		156.05
Manufactured material:		
Sand, 4 cubic yards, at $1.67	6.68	
Brick, 14,000, at $13.33⅓	186.67	
		193.35
Cost of prison labor:		
Plumbers, 29 days	14.50	
Painters, 12½ days	6.25	
Bricklayers, 109 days	54.50	
Carpenters, 19 days	9.50	
		84.75
Total		434.15

SLAUGHTERHOUSE.

Material chargeable to the appropriations:		
Cement	$11.50	
Miscellaneous	1.35	
No labor chargeable to the appropriations.		
Total chargeable to the appropriations		12.85
Manufactured material:		
Brick, 2,400, at $13.33⅓	32.00	
Lumber, 1,500 feet, at $20	30.00	
		62.00
Cost of prison labor:		
Bricklayers, 10 days	5.00	
Laborers, 20 days	10.00	
		15.00
Total cost		89.85

REPAIRS ON A, B, C, QUARTERS.

Material chargeable to the appropriations:		
Lime	$40.65	
Paint	68.25	
Cement	23.00	
Fly screen	10.80	
Electrical	29.49	
Miscellaneous	2.07	
		$174.
Force account chargeable to the appropriations:		
Bricklayers, 8 days, at $4	32.00	
Carpenters, 2 days, at $2.33	4.66	
		36.
Total chargeable to the appropriations		210.
Manufactured material:		
Brick, 22,300, at $13.33⅓	297.33	
Sand, 8 cubic yards, at $1.67	13.36	
		310.
Cost of prison labor:		
Plumbers, 7 days	3.50	
Bricklayers, 90 days	45.00	
Electrician, ½ day	.25	
Painter, 1 day	.50	
Carpenters, 10 days	5.00	
		54.
Total cost		575.

REPAIRS AT NINTH STREET YARD AND WHARF.

Material chargeable to the appropriations:		
Roofing	$9.90	
Paint	17.60	
Tools	.20	
Electrical	2.30	
Range	12.50	
Miscellaneous	21.76	
Total chargeable to the appropriations		64.
Manufactured material: Brick, 1,800, at $13.33⅓		24.
Cost of prison labor:		
Electricians, 4½ days	$2.25	
Blacksmith, 2½ days	1.25	
Painters, ½ day	.25	
		3.
Total cost of repairs		92.

WORK ON CULVERT ALONG TELEGRAPH ROAD.

Material chargeable to the appropriations:		
Tools	$4.78	
Cement	161.00	
Lime	54.00	
		219.
Force account chargeable to the appropriations: Bricklayer 26 days		104.
Total chargeable to the appropriations		323.
Manufactured material:		
Brick, 50 000, at $13.33⅓	$666.67	
Sand, 20 cubic yards, at $1.67	33.40	
		700.
Cost of prison labor: On brickwork and excavating, 235 days		117.
Total cost		1,141.

FENCE ALONG ROAD TO WHARF.

ıterial chargeable to the appropriations: Nails, etc		$4.51
rce account chargeable to the appropriations: Carpenters—		
7 days, at $2.33	$16.31	
2 days, at $4	8.00	
		24.31
Total chargeable to the appropriations		28.82
ınufactured material: Lumber, 3,000 feet, at $20		60.00
st of prison labor: Carpenters' helpers and post-hole liggers, 115 days		57.50
Total cost		146.32

SHED OVER DUMP CARS FOR RAILROAD.

ıterial chargeable to the appropriations:		
Roofing	$44.00	
Nails	8.00	
Total chargeable to the appropriations		52.00
ınufactured material: Lumber, 3,500 feet, at $20		70.00
ison labor: Carpenters, 50 days		25.00
Total cost		147.00

REPAIRS TO AND ALTERATIONS IN THE ADMINISTRATION BUILDING.

aterial chargeable to the appropriations:		
Flooring	$27.50	
Lumber	100.00	
Plumbing	6.82	
Electrical	4.88	
Miscellaneous	12.33	
Nails	8.30	
		159.83
orce account chargeable to the appropriations:		
Carpenters, 42 days	168.00	
Bricklayers, 1½ days	6.00	
		174.00
Total chargeable to the appropriations		333.83
ſanufactured material:		
Lumber, 3,000 cubic feet, at $20	60.00	
Sand, 2 cubic yards, at $1.67	3.34	
		63.34
ost of prison labor:		
Carpenters, 110½ days	55.25	
Blacksmith, 1 day	.50	
Painters, 9 days	4.50	
Plumbers, 8 days	4.00	
Bricklayers, 6 days	3.00	
		67.25
Total cost		464.42

CULVERT IN QUARRY.

(See reformatory report.)

Material chargeable to the appropriations: Miscellaneous		.94
Force account chargeable to the appropriations:		
Carpenters, 2 days	$8.00	
Bricklayers, 30 days, at $4	120.00	
		128.00
Total chargeable to the *appropriations*		128.94

Manufactured material: Sand, 25 cubic yards, at $1.67		$41.75
Cost of prison labor:		
Carpenters, 8 days	$4.00	
Bricklayers, 263 days	131.50	
		135.50
Total cost		306.19

TUBERCULOSIS COTTAGE.

Material chargeable to the appropriations:		
Fly screen	$25.34	
Miscellaneous	3.33	
		28.67
Force account chargeable to the appropriations (previously reported under female department): 19 days of carpenter work, at $2.33		44.27

WORK AT THE COMMISSARY.

Material chargeable to the appropriations:		
Lumber	$419.50	
Beaver board	194.20	
Miscellaneous	10.09	
		623.79
Force account chargeable to the appropriations: Carpenters, 31 days, at $4		124.00
Total chargeable to the appropriations		747.79
No manufactured material used.		
Cost of prison labor:		
Carpenters, 26½ days	$130.75	
Electricians, 2½ days	1.25	
Plumbers, 2 days	1.00	
Painters, 5 days	2.50	
		135.50
Total cost		883.29

LARGE SIGNBOARD.

Material chargeable to the appropriations:		
Lumber	$24.00	
Paint	3.15	
Electrical	4.92	
Miscellaneous	1.35	
		33.42
Force account chargeable to the appropriations: Carpenters, 7 days, at $4		28.00
Total chargeable to the appropriations		61.42
No manufactured material used.		
Cost of prison labor:		
Carpenters, 24 days	$12.00	
Electrician, 10 days	5.00	
Painters, 11 days	5.50	
Plumbers, 4 days	2.00	
		24.50
Total cost		85.92

STEAM TUNNEL FROM THE COMMISSARY TO THE DAIRY.

Material chargeable to the appropriations: Plumbing		$3.52
Force account, 7½ days		30.00
Total chargeable to the appropriations		33.52
Manufactured material:		
Brick, 1,200, at 13.33⅓	$16.00	
Lumber, 500 feet, at $20	10.00	
Sand, 3 cubic yards, at $1.67	5.01	
Stone, 2 cubic yards, at $1.95	3.90	
		34.91
Cost of prison labor:		
Excavating, 20 days	10.00	
Bricklaying, 35 days	17.50	
Plumbing, 20 days	10.00	
		37.50
Total cost		105.93

RAILROAD.

(See reformatory report.)

Material chargeable to the appropriation:		
Tools	$6.58	
Dynamite	40.30	
Miscellaneous	80.76	
Total chargeable to the appropriations		127.64
No manufactured material used except railroad ties, which are to be reported later.		
Cost of prison labor:		
Grading and laying track, 2,544½ days	$1,272.25	
Painting	3.75	
		1,276.00
Total cost		1,403.64

ICE PLANT AT THE CENTRAL POWER PLANT.

(See reformatory report.)

Material chargeable to the appropriations. *See* report for the reformatory.		
Force account chargeable to the appropriations:		
Carpenters, 26 days	$104.00	
Cement work, 14 days, at $4	56.00	
		160.00
For manufactured material *see* reformatory report.		
Cost of prison labor:		
Blacksmith, 1 day	$0.50	
Carpenters, 97 days	48.50	
Helpers to contractor, 130 days	65.00	
Excavating, 41 days	20.50	
Cement workers, 97 days	48.50	
Plasterers, 13 days	6.50	
Plumbers, 19 days	9.50	
Electricians, 3 days	1.50	
		200.50
Total cost		360.50

STEAM TUNNEL FROM ICE PLANT TO STONE CRUSHER.

Material (reported with the reformatory).		
Cost of prison labor:		
Excavating, 452 days	$226.00	
Bricklayers, 176 days	88.00	
Total cost		314.00

PHYSICIANS' RESIDENCE.

Material charged against the workhouse on the requisitions for manufactured material (*see* reformatory for all other costs):		
Brick, 25,000, at $13.33⅓	$333.33	
Sand, 20 cubic yards, at $1.67	33.40	
Stone, 10 cubic yards, at $1.95	19.50	
		$386.23
Cost of prison labor: Plumbing (roughing in), 6 days		3.00
Total cost		389.23

EXPENSES OF THE CONSTRUCTING ENGINEER'S OFFICE.

(See reformatory report.)

Material chargeable to the appropriations:		
Tools	$1.98	
Gasoline and oil for Ford truck	23.75	
Repair parts, tires, etc., for Ford truck	48.44	
Miscellaneous	.91	
		75.08

REPAIR WORK IN THE HORSE STABLE.

Material chargeable to the appropriations: Miscellaneous		17.24
Force account chargeable to the appropriations: Carpenters, 13 days, at $4		52.00
Total chargeable to the appropriations		69.24
Manufactured material: Lumber, 5,000 feet, at $20		110.00
Cost of prison labor:		
Carpenters, 62 days	$31.00	
Blacksmith, 1½ days	.75	
Electrician, 2 days	1.00	
Painters, 3½ days	1.75	
Plumbers, 7½ days	3.75	
		38.25
Total cost		217.49

WORK ON PERMANENT POWER LINE TO THE REFORMATORY.

(See reformatory report.)

Workhouse prison labor, 25 days	12.50

REPAIR WORK ON WAGON ROAD.

Chargeable to the appropriations:		
Hired force, 14 days, at $4	$56.00	
Prison labor, 947 days	473.50	
		529.50

GENERAL BLACKSMITH WORK.

Material chargeable to the appropriations:		
Tools	$26.86	
Iron	73.23	
Miscellaneous	334.90	
Total chargeable to the appropriations		434.99
No manufactured material used.		
Prison labor, 1,397 days		698.50
Total chargeable to the appropriations		1,133.49

GENERAL ELECTRICAL WORK.

Material chargeable to the appropriations:		
Tools	$0.98	
Repairs to motor for well at gate	15.90	
Wire	99.80	
Rewinding motor	86.00	
Spike poles	10.80	
Miscellaneous	245.45	
Total chargeable to the appropriations		$458.93
Cost of prison labor, 181½ days		90.75
Total cost		549.68

GENERAL PAINTING.

Material chargeable to the appropriations:		
Paint	$656.29	
Tools	44.48	
Glass	97.02	
Linseed oil	170.00	
Turpentine	58.00	
		1,025.79
Prison labor, 450 days		225.00
		1,250.79

GENERAL PLUMBING AND STEAM FITTING.

Material chargeable to the appropriations:		
Cement	$1.95	
Tools	8.38	
Pipe fittings	419.90	
Magnesia	42.50	
Drain	29.34	
Radiators	108.69	
Miscellaneous	246.69	
Lime	9.50	
		909.45
Prison labor, 1,004 days		502.00
Total cost		1,411.45

MISCELLANEOUS WORK.

Chargeable to the appropriations:	
Material used in the installation of road lights	34.17
Material used on wharf road	1.17
Material used on scales at wharf	7.28
Material used on hotbeds, glass	25.00
Miscellaneous material	6.48
Tools to cement worker	4.22
Machine shop—	
Oxygen	70.00
Tools	2.89
Quarry tools	4.50
Total	155.71
Force account chargeable to the appropriations:	
Cement work at Dawson House, 1½ days	6.00
Paving sidewalk to hospital, 2 days	8.00
Total chargeable to the appropriations	169.71
Prison labor, 137 days	68.50
Total cost	238.21

GENERAL WORK BY THE CARPENTER SHOP.

Material chargeable to the appropriations:		
Miscellaneous	$99.47	
Fly screen	9.00	
Roofing	6.60	
Tools	21.44	
		$136.51
Force account chargeable to the appropriations: Carpenters, 45½ days, at $4		182.00
Total chargeable to the appropriations		318.51
Manufactured material: Lumber, 1,500 feet, at $20		30.00
Prison labor: 437½ days		218.75
Total cost		218.75

APPROPRIATION FOR FUEL, OILS, AND REPAIRS.

Manufacturing and construction, 1918	30,000.00
Addition to above because of high price of coal	12,000.00
Appropriation for material for repairs to buildings, etc	4,000.00
Appropriation for dairy and forage building	4,000.00
Total appropriations	50,000.00
Chargeable against the above appropriations:	
Silos	296.00
Superintendent's residence	1,907.07
Assistant superintendent's residence	874.21
"Pollock House"	91.66
Farmer's cottage	256.22
Work at the female department	802.24
Repair work at the dairy	288.17
Work on old ice plant	101.13
Work on the hog pens	371.77
Repairs to scows, house boat, tugs, etc	817.62
Prisoners' kitchen and dining room	142.73
Repairs to sawmill	44.26
Repair work at brickyard	755.36
Repair work at poultry yards	251.30
Repair work at boiler house	157.66
New chimney at boiler house	1,751.95
Enlargement to central power plant	796.34
Work on calf sheds	96.00
Repair work on the "Dawson House"	64.35
Repairs to stone crusher	18.78
Work done at mess hall on lower site	283.85
Repairs to pumping station	131.35
Repair work on hospital	198.23
Repair work to officers' quarters	157.49
Repair work on the rest hall	156.05
Work at the slaughterhouse	12.85
Repairs to A, B, and C quarters	210.92
Repairs at Ninth Street yard and wharf	64.26
Work on culvert along telegraph road	323.73
Fence along road to wharf	28.82
Shed over railroad dump cars	52.00
Repairs to and alterations in the administration building	333.83
Culvert in quarry	128.94
Tuberculosis cottage	28.67
Work at the commissary	747.79
Large sign boards	61.42
Steam tunnel from commissary to the dairy	33.52
Railroad	127.64
Ice plant at central power plant	160.00

Chargeable against the above appropriations—Continued.

Expenses of constructing engineer's office	$75.08
Repair work in horse stable	69.24
Repair work on wagon roads	529.50
General blacksmith work	434.99
General electrical work	458.93
General painting	1,025.79
General plumbing	909.45
Miscellaneous work	169.71
General work by the carpenter shop	318.51
Total	17,117.43
Spent for fuel, oil, wages, etc., plus material in the commissary (not included in the above)	32,601.10
Total	49,718.53
Unexpended	281.47

C. B. BACKUS,
Constructing Engineer.

SNOWDEN ASHFORD,
Municipal Architect.

To Capt. CAREY H. BROWN.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, *July 31, 1919.*

SIR: I submit herewith annual report covering the transactions of the building division during the fiscal year ended June 30, 1919.

No report of Federal Government operations has been received during the year.

Statement of permits issued from July 1, 1918, to June 30, 1919.

	Number.	Value.
Brick:		
Repairs	1,053	$1,325,177
Dwellings	413	2,062,950
Apartments	19	1,457,000
Stores and dwellings	2	8,000
Office buildings	6	284,800
Stores	11	119,980
Warehouses	16	173,865
Workshops	5	92,050
Hotel	1	200,000
Church	1	45,000
Post office	1	8,000
Dairy	1	16,000
Banks	2	120,000
Theater	1	50,800
Blacksmithy	1	4,000
Service station	1	50,000
Reduction plant	1	10,000
Garages	568	739,773
Sheds	9	10,895
Stables	2	1,250
Substation	1	3,000
Hollow tile:		
Dwellings	11	70,100
Garages	129	53,942
Drill hall	1	60,000
Shed	2	330
Resthouse	1	10,000
Laundry	1	1,500
Boiler house	1	3,770
Repairs	4	8,150
Stone:		
Dwelling	1	15,000
Church	1	22,000
Garage	1	900
Concrete:		
Apartments	2	$1,000,000
Freight shed	1	160,000
Warehouses	2	52,200
Power house	1	62,000
Laboratory	1	8,000
Repairs	3	3,350
Office	1	600
Shelter house	1	600
Supply house	1	1,000
Garages	45	33,220
Shed	1	25
Metal:		
Garages	858	164,321
Sheds	25	6,660
Frame:		
Sheds	229	44,547
Repairs	315	100,273
Dwellings	324	1,350,195
Garages	204	44,041
Stable	1	1,500
Office	1	150
Church	2	8,700
Stores	3	5,400
Boathouse	1	3,500
Elevators	59	194,529
Motors	618	207,620
Boilers	63	23,378
Gas engines	2	4,250
Total	5,032	10,508,291
Awnings	89	6,675
Signs	590	5,900
Grand total	5,711	10,520,866

The following summary shows the distribution of improvements in the respective sections of the District and the values of same:

	Buildings.	Repairs, etc.
Northeast	$241,680	$113,159
Southeast	276,745	111,017
Northwest	2,899,437	1,342,260
Southwest	252,900	74,507
County	4,715,958	480,628
Total	8,386,720	2,121,571
	2,121,571	
Sum total[1]	10,508,291	

[1] Does not include awnings or signs, the values of which are estimated.

Grand total for all building operations, $10,520,866.

Comparative statement for years 1918 and 1919.

	New buildings.	Repairs, etc.	Dwellings.	Apartments.	Business buildings.
1919	1,598	3,434	749	21	828
1918	957	2,610	529	9	419
	[1] 641	[1] 824	[1] 220	[1] 12	[1] 409

[1] Increase.

Valuation of building operations, including awnings and signs:	
1919	$10,520,866
1918	10,164,457
Increase	356,409
Permits issued, number of, including awnings and signs:	
1919	4,948
1918	3,906
Increase	1,042
Projections beyond the building line, number for which permits issued:	
1919	903
1918	1,102
Decrease	199

Estimated number of buildings in the District of Columbia.

	Brick.	Frame.
1919, erected	1,267	331
1919, razed	39	128
	1,228	203
1918	65,401	26,806
Total estimated number standing	66,629	27,009

Notwithstanding the high cost of labor and material there has been a very marked increase in building operations during the current year.

The expenses for the year exceeded the receipts of building fees by approximately $7,600.

Since the close of active war operations and the signing of the armistice several employees of this division who were in the military service with the A. E. F. have returned and been reinstated in this division.

JOHN P. HEALY,
Inspector of Buildings.

The ASSISTANT TO THE ENGINEER COMMISSIONER, *District of Columbia.*

REPORT OF INSPECTOR OF STEAM BOILERS.

WASHINGTON, D. C., *October 6, 1919.*

SIR: I have the honor to submit the following report for the fiscal year ended June 30, 1919, together with fees received and expenses incurred:

Boilers inspected	431
Boilers inspected for District of Columbia	85
Boilers inspected for United States	9
Boilers condemned as unfit for further use	8
Cases of scale and deposit	75
Cases of defective setting	85
Cases of defective steam gauges	21
Cases of defective tubes	84
Cases of defective shell plates	12
Total amount received	$2,155
Total amount expended	$320
Balance	$1,835

Very respectfully,

E. F. VERMILLION,
Inspector of Steam Boilers.

To the INSPECTOR OF BUILDINGS.

REPORT OF BOARD OF EXAMINERS OF STEAM ENGINEERS.

WASHINGTON, D. C., *August 15, 1919.*

SIR: The board of examiners of steam engineers have the honor to submit to you the report for the year ending June 30, 1919.

The following table shows the work as it progressed during each month:

	Meetings held.	Applicants received.	Applicants approved.	Applicants incompetent.	First class.	Second class.	Third class.	Special class.	Duplicate.
1918.									
July	4	9	2	7			2		
August	5	19	8	11		1	5	2	
September	4	10	5	5			3		2
October	4	3	3		1		1		1
November	5	22	10	12	1		6	3	
December	4	6		6					
1919									
January	5	19	8	11	1		6	1	
February	4	3	3				3		
March	4	11	4	7			4		
April	4	8	2	6			2		
May	5	8	2	6	1		1		
June	4	11	2	9			2		
Total	52	129	49	80	4	1	35	6	3

In addition to examining applicants for steam engineer's license the board has also conducted the examination of applicants for automobile and motor cycle operators, a full report of which is being submitted by the secretary of the automobile board.

E. F. VERMILLION.
H. BOESCH, *Secretary.*
W. I. EVANS.

The INSPECTOR OF BUILDINGS.

REPORT OF INSPECTOR OF PLUMBING.

WASHINGTON, D. C., *September 10, 1919.*

SIR: I have the honor to make the thirty-seventh annual report of this plumbing inspection division, engineer department:

Preliminary examinations	6,750
Cast-iron sewers:	
New	2,937
Repairs	925
Terra-cotta sewers:	
New	56
Repairs	1,208
Main sewers tapped	822
Rough work in—	
New houses	1,373
Old houses	1,333
Water services	561
Notices served	190
Peppermint tests and final inspections	1,450
Work not ready for inspection when ordered	344
Changes ordered in work incorrectly installed	429
Special inspections of municipal work	437
Gas	1,072
Complaints	6,548
Total for field inspectors	26,435

of materials, etc., by the principal assistant, visits to homes of witnesses, police

Inspections of a general nature by the head of the office, 1,481; examination court, and general police work which does not appear elsewhere, 621; and special inspections in connection with general construction work for the District, 582. These added to number of "field inspections" make a total of 29,119 recorded inspections.

In addition to recorded inspections, one of the force has been solely and continuously on inspection work on the dormitories, dwellings, and other buildings erected by the United States Housing Corporation, dividing his time between the projects at the Union Station Plaza, Fourteenth and B Streets NW., and the navy yard groups.

The following table shows the total inspections made each year since the fiscal year 1895:

1895–6	8,677	1907–8	29,547
1896–7	14,112	1908–9	39,404
1897–8	17,550	1909–10	44,953
1898–9	17,600	1910–11	46,035
1899–1900	17,405	1911–12	45,875
1900–1	19,965	1912–13	41,644
1901–2	32,621	1913–14	37,177
1902–3	25,297	1914–15	37,478
1903–4	25,637	1915–16	35,742
1904–5	27,337	1916–17	35,189
1905–6	30,185	1917–18	29,638
1906–7	32,190	1918–19	29,119

The total number of inspections made by the field force divided by the actual number of days on duty shows that the average day's work was about 13½ per cent inspections per day. The largest number of inspections in any one day was 38.

It is estimated that new plumbing work to the extent of $778,969 was installed in privately owned buildings during the year, and that about $561,870 was expended for remodeling and repairs to existing plumbing. The best estimate obtainable is that the District government, the officer in charge of public buildings and grounds, the architect of the Capitol, and the United States Housing Corporation, spent for new and repair work in the District, $1,720,000 and $80,000, respectively, making a grand total of more than $3,000,000 spent for plumbing work here during the year.

POLICE COURT CASES.

The total number of warrants obtained was 20, divided as follows:

Violations of the plumbing regulations	13
Work done by unlicensed plumbers	7
Total	20

These cases were disposed of as follows:

Nolle-prossed on compliance with commissioners' order	8
Fined	9
Personal bonds	2
Dismissed	1
Total	20
Amount collected from fines	$122
Preliminary inspections	1,025

OFFICE WORK.

The following table shows the amount of office work performed during the past year and a comparison with that of the preceding five years:

	1914	1915	1916	1917	1918	1919
Official letters	1,138	877	845	978	604	892
Unofficial letters	4,138	3,957	3,742	3,563	2,744	3,322
Indorsements	2,118	1,180	1,300	1,092	692	987
Inspectors' reports	9,015	9,715	9,440	9,345	7,754	9,921
Indexes	1,683	1,332	1,400	1,579	2,238	4,551
Plans prepared	26	30	24	27	17	22
Specifications prepared	34	66	55	63	15	31
Plans and specifications revised	1	1	3	2	6	10
Examination of plans for new buildings	1,857	1,486	1,361	1,567	734	986
Examination of applications for minor buildings and repairs	3,138	3,347	2,955	2,761	2,604	2,152

Postage stamps used: 3-cent, 1,994; 2-cent, 2,265; 1-cent, 796. Car tickets used, 886.

REGULATIONS.

But one change of any moment was made in the plumbing code during the year, and that provided for broadening the scope of, and conditions under which loop or circuit venting could be used, especially in dwellings and small apartment houses. This regulation now provides that by slightly increasing the size of the waste pipe, two to three branch vent pipes may be omitted at a conservatively estimated saving in labor and material of $20 a bathroom. Assuming this year's permits for building dwellings and small apartment houses, it would have, if availed of, saved the property owners nearly $20,000.

COMPULSORY DRAINAGE.

Forty-one cases were recommended, during the last year, for compulsory sewer and water connections, by the health department and other branches of the District Government and notices were served in each of these cases. Sixteen of these notices were complied with by owners or agents; on four of the cases the work was done by the District of Columbia and assessment made, and there are 21 cases pending. In four of them, further action is suspended as the buildings are not now occupied. Some of the pending cases were ready for prosecution but the appropriation was exhausted within three months.

It is recommended that in the future this appropriation be made $5,000, as it was several years ago, instead of the current $1,000. This is a reimbursable appropriation, in that, with the exception of not to exceed $50 each year, the expended amounts are returned to the Treasury as an assessment under the general taxes.

PLUMBING BOARD.

There were 24 regular meetings held for the examination and rating of candidates for master plumbers and gasfitters during the last year. The total number examined was 29. The number of original candidates examined for licensing as master plumbers and gasfitters was 14, of whom 2 passed. Of the 15 who had been previously examined for licensing as master plumbers and gasfitters (3 of whom have taken the examination two or more times within the fiscal year), 3 passed and 12 failed.

Examinations of candidates appearing before the board one or more times resulted as follows:

Examination.	Passed.	Failed.	Examination.	Passed.	Failed.
First	2	14	Sixth	1	
Second	2	4	Seventh		
Third	3		Eighth		
Fourth	2		Ninth		1
Fifth					

There were, on June 30, 1919, 233 registered master plumbers, about 179 being actively engaged in business. There were also 8 registered gas fitters in business.

PUBLIC CONVENIENCE STATIONS.

Four public convenience stations were in operation during the year, open from 6 a. m. until midnight, with two shifts of attendants, each working nine hours per day. The station at Seventh Street and Pennsylvania Avenue NW. accommodated 10,027,848 persons; the one at Thirteen-and-a-half Street and Pennsylvania Avenue, 1,111,984; at Ninth and K Streets NW., 1,439,472; and at Fifteenth Street and Maryland Avenue NE., 721,988 during the year, making a total patronage of 13,301,292, being more than a million a month for the four stations, or 37,500 per day, 2,100 per hour, nearly 35 per minute, all the time the stations were open.

The patronage of women amounted to nearly 16 per cent of the whole number, and they contributed about 20 per cent of the cash receipts. This money was received for use of pay toilets, the rental of clean towels, shoe-shining concessions, telephone commissions, etc., and amounted to $7,019.75, being slightly over 45 per cent of the total cost of operating the stations. This is more than double the showing of any of the 12 cities of which we have record.

The patronage of these stations has nearly doubled in a year and a half, partly attributable to the increase in population and partly to the closing of the saloons, which all provided general toilet facilities.

There are several locations where the need for them is pressing, and it is urgently recommended that not only the enlargement of the station at Seventh Street and Pennsylvania Avenue be considered, but that steps be taken to obtain appropriations for one additional station each year.

WAR BUILDINGS.

Not only were many large temporary Government office buildings constructed in the District in which the General Government type of plumbing, which is well suited to such structures, was installed, but the United States Housing Corporation constructed three great groups of dormitories and commandeered many vacant dwellings for use of war workers. In many cities throughout the country there was much friction between this great Government agency and the local authorities, especially as relating to plumbing matters. The officers of the corporation here took the question up with this office in a fair and just spirit, and with exception of very minor changes the plumbing work was planned and installed in accordance with the District regulations and the highest type of sanitary construction.

I take this opportunity to state, as the opinion of this office, that the plumbing work installed in the three great housing groups, and later tested by the District inspector, is as perfectly substantial and sanitary as in any hotel or apartment house in the city, and to acknowledge the unfailing courtesy of the officials of that corporation in all our dealings.

"OUR SERVICE FLAG."

m a normal force of 17, 9 men went from this office into uniform, 1 om, John J. Murphy, seaman, United States Navy, and formerly an as- t inspector, died in service.

r had service in France, and five won commissions; one major and one n of Infantry, one first lieutenant and one second lieutenant of Engi- and one second lieutenant in the Air Service.

ddition to the nine who went, two others applied for service, but were re- on physical grounds.

onclusion, I beg to commend to you the employees of this office, and es- y the "field force," for their conscientious and faithful performance of luring the past year, many times under trying conditions and at all under the burden of a salary insufficient for even a reasonably adequate t.

A. R. McGONEGAL,
Inspector of Plumbing.

INSPECTOR OF BUILDINGS.

REPORT OF THE PERMIT CLERK.

WASHINGTON, D. C., *August 15, 1919.*

I have the honor to submit the annual report of this office, giving the ter and number of permits issued during the fiscal year ended June 19:

PERMITS FOR WHICH FEES WERE PAID.

connections	$853
epairs	661
connections	935
epairs	718
nd electric light connections	1,531
epairs	223
tire-inflating, gasoline and steam lines	16
ilts, electric, construct and repair	226
ains, construct and repair	87
l stones, place in alleys	11
oles, construct, enlarge, also connect with sewers	109
pe lines, repair	1
ng fences, erect	194
, lay across sidewalks, also alleys	2
telegraph and telephone, erect, replace, and remove	443
for wagons	270
Total	6,280

PERMITS FOR WHICH FEES ARE NOT PAID.

s, grade	3
ing	10
es across gutters	5
s, string aerial	68
gs, erect	44
ways, construct and repair	77
es, steam shovels, and heavy machinery, move through streets	156
s inclosing parkings, repair	30
ng leads, lay and repair	139
ngs, pave	85
its, renew and extend	41
replace trolley	5
ing line, oil, repair	1
ways, close temporarily	13
ways, grade and repair	58
alk space, grade	8
alks, haul across	42
alks, lay and repair	115
alk and roadway, occupy temporarily	2

Sidewalks, use for business purposes	5
Shelter houses, erect and place at curb	2
Steam and electric railways	14
Steps in terraces, construct and repair	67
Stopcock boxes, regulate and replace	49
Trees, trim and remove	43
Tree space, pave	16
United States Government	50
Walls, retaining, build or repair	86
Water tables, lay and repair	34
Wires, string overhead connections	255
Special water, sewer, gas, and electric	569
Miscellaneous	15
Total	2,057

One thousand nine hundred and seventeen communications were referred to this office, briefs were made on cards, permits issued when necessary, reports made, papers indorsed and returned to the respective divisions having supervision over the inspection of the work for which permits were issued.

Applications for all permits were sorted, arranged according to location of the work, and filed for ready reference. Written report was made of all permits for excavations in the public space and forwarded to the engineer of highways.

Very respectfully,

H. M. WOODWARD,
Permit Clerk.

To the INSPECTOR OF BUILDINGS.

REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, *October 10, 1919.*

SIR: I have the honor to submit the following report of the operations of the electrical department for the fiscal year ended June 30, 1919.

Very respectfully,

WARREN B. HADLEY,
Electrical Engineer.

ASSISTANT TO THE ENGINEER COMMISSIONER.

STREET LIGHTING.

The street lighting system has again been maintained and the most necessary sporadic additions and extensions made, improvement projects having been again deferred by reason of war and after-war conditions.

IMPROVED INCANDESCENT ELECTRIC LIGHTING.

This system has been extended only by the installation of eighteen 100-candlepower lamps, in completion of the treatment of the area Seventeenth to Twenty-third, B to E Streets NW., in the vicinity of the temporary Federal Government buildings, by five 100-candlepower lamps on B Street between First and Second Streets Northeast, and by one 100-candlepower lamp on Sixteenth Street Northwest, at Colorado Avenue.

NERNST LAMPS.

The sixty-four 4-glower Nernst lamps on the Connecticut Avenue Bridge across Rock Creek were replaced by sixty-four 200-candlepower filament lamps, the progress in efficiency development of the latter and the recent poor quality of material in maintenance parts for the former resulting in treating the Nernst lamp as obsolete.

ARC LIGHTING.

This system has been affected only by the discontinuance of two 4-ampere magnetite lamps.

LIGHTING ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against steam railroad companies to compel repayment for the sums expended by the District in maintaining lights along the respective rights of way of such companies, has been affected only by the obtaining of a verdict

nd judgment for approximately $11,000 in a suit against Washington Terminal Co., followed by appeal to Court of Appeals. Further suits have been ntered on newly accrued claims.

SIGNAL SYSTEMS.

The fire-alarm telegraph, police patrol signal and the telephone systems have een operated and maintained and each has expanded slightly in the line of atural growth. The distribution plant of these combined systems was increased by the net addition of nearly 100 miles of conductor to a present total f upward of 6,300 miles.

INSPECTION OF ELECTRICAL WIRES AND APPARATUS.

It is notable that the general and pronounced falling off in building operations during the year did not result in a diminution in the number of electrical inspections. Furthermore the growing average complexity of electric installations with the expansion of the business and the multiplication of inds of utilization appliances and the increasing thoroughness of inspection with growing realization of need, result in lessening the average number of nspections possible per day per inspector. With the resumption of building ctivity, an increase of this inspection force appears essential.

LAMPS OF ALL KINDS IN SERVICE JULY 1, 1919, AS COMPARED WITH JULY 1, 1918.

Kind of light.	1918	1919
Mantle gas	10,417	10,431
Electric arc:		
6.6-ampere magnetite	280	280
4-ampere magnetite	517	515
Electric incandescent:		
250-candlepower, series	10	10
200-candlepower, multiple	.....	64
100-candlepower, series	3,699	3,772
100-candlepower, multiple	98	98
60-candlepower, series	3,588	3,637
60-candlepower, multiple	321	318
4-glower Nernst	64	.....
Street designation lamps:		
Gas	393	394
Electric	119	131
Total	19,596	19,650

Net increase during year, 144 lamps.

During the year the following changes have been made in the various forms of street lighting:

Kind of light.	Added.	Discontinued.
Mantle gas	71	[1] 57
Electric arc, 4-ampere magnetite	.....	2
Electric incandescent:		
200-candlepower, multiple	64	.....
100-candlepower, series	92	19
60-candlepower, series	49	.....
60-candlepower, multiple	2	5
4-glower Nernst	.....	[2] 64
Street designation lamps on fire-alarm posts: Gas	2	1
Electric incandescent	12	.....
Total	292	148

[1] Of this number, 33 were replaced by 100-candlepower and 5 by 60-candlepower incandescent electric lamps.
[2] These lamps were replaced by 200-candlepower incandescent electric lamps.
Net increase during the year, 144 lamps.

Summary of changes.

Net increase in number of lamps	144
Discontinued	46
Replaced by other kinds	102
Total changes	292

Cable installed and withdrawn during the year and amount in service June 30, 1919.

INSTALLED.

Size of cable.	Signal.		Telephone.			Combination.					Total.			
	Cable.	Conductors (Brown & Sharpe) No. 14.	Cable.	Conductors (Brown & Sharpe).		Cable.	(Conductors (Brown & Sharpe).				Cable.	Conductors (Brown & Sharpe).		
				No. 19.	No. 22.		No. 14.		No. 19.			No. 14.	No. 19.	No. 22.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*No.*	*Feet.*	*No.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
50-pair			897	89,700							897		89,700	
45-pair						118	15	3,540	30	7,080	118	3,540	7,080	
35-pair						1,938	10	38,760	25	96,900	1,938	38,760	96,900	
30-pair						1,617	10	32,340	20	64,680	1,617	32,340	64,680	
12-pair						1,926	6	23,112	6	23,112	1,926	23,112	23,112	
8-pair						11,276	4	90,208	4	90,208	11,276	90,208	90,208	
5-pair						664	3	3,984	2	2,656	664	3,984	2,656	
3-pair						782	2	3,128	1	1,564	782	3,128	1,564	
Total			897	89,700		18,321		195,072		286,200	19,218	195,072	375,900	

WITHDRAWN.

12-pair						888	6	10,656	6	10,656	888	10,656	10,656	
10-pair						112	5	1,120	5	1,120	112	1,120	1,120	
8-pair						1,609	4	12,872	4	12,872	1,609	12,872	12,872	
3-pair						820	2	3,280	1	1,640	820	3,280	1,640	
Total						3,429		27,928		26,288	3,429	27,928	26,288	

IN SERVICE JUNE 30, 1919.

150-pair			7,941		2,382,300					7,941				2,382,300
100-pair			2,310		462,000					2,310				462,000
100-pair			10,812	2,162,400						10,812			2,162,400	
90-pair						480	30	28,800	60	57,600	480	28,800	57,600	
80-pair						4,503	30	270,180	50	450,300	4,503	270,180	450,300	
75-pair			4,275	641,250							4,275		641,250	
70-pair						1,857	30	111,420	40	148,560	1,857	111,420	148,560	
65-pair						2,785	15	83,550	50	278,500	2,785	83,550	278,500	
60-pair			250	30,000		2,940	30	176,400	30	176,400	3,190	176,400	206,400	
55-pair						11,401	15	342,030	40	912,080	11,401	342,030	912,080	
50-pair	2,533	253,300	16,604	1,449,000	211,400						19,137	253,300	1,449,000	211,400
45-pair						6,214	20	248,560	25	310,700	6,214	248,560	310,700	
45-pair						21,037	15	631,110	30	1,262,220	21,037	631,110	1,262,220	
40-pair						7,542	15	226,260	25	377,100	7,542	226,260	377,100	
35-pair						23,767	15	713,010	20	950,680	23,767	713,010	950,680	
35-pair						1,938	10	38,760	25	96,900	1,938	38,760	96,900	
33-pair						4,633	17	157,522	16	148,256	4,633	157,522	148,256	
30-pair	13,019	781,140	4,179	250,740		574	15	17,220	15	17,220	17,772	798,360	267,960	
30-pair						68,618	10	1,372,360	20	2,744,720	68,618	1,372,360	2,744,720	
25-pair			20,010	1,000,500		25,389	10	507,780	15	761,670	45,399	507,780	1,762,170	
20-pair			12,071	482,840		24,517	10	490,340	10	490,340	36,588	490,340	973,180	
18-pair						5,494	8	87,904	10	109,880	5,494	87,904	109,880	
15-pair	19,247	577,410	3,652	109,560		7,786	8	124,576	7	109,004	30,685	701,986	218,564	
14-pair						7,016	6	84,192	8	112,256	7,016	84,192	112,256	
12-pair	12,489	299,736				76,072	6	912,964	6	912,964	88,561	1,212,700	912,964	
10-pair	570	11,400				24,791	5	247,910	5	247,910	25,361	259,310	247,910	
3-pair						219,308	4	1,754,464	4	1,754,464	219,308	1,754,464	1,754,464	
8-pair						5,984	4	47,872	2	23,936	5,984	47,872	23,936	
6-pair						33,367	3	200,202	2	133,468	33,367	200,202	133,468	
5-pair						117,210	2	468,840	1	234,038	117,210	468,840	234,038	
Total	47,858	1,922,986	82,104	6,126,260	3,055,700	705,223		9,344,226		12,821,166	835,185	11,267,212	18,947,456	3,055,700

Installed 3.64 miles of cable containing 108.14 miles of conductor; withdrawn, 0.649 miles of cable containing 10.268 miles of conductor; in service June 30, 1919, 158.179 miles of cable containing 6,301.206 miles of conductor.

Amount of space occupied by cable installed and withdrawn during year and that in service July 1, 1919.

Ownership of conduit.	Space occupied by cable.		
	Installed during year.	Withdrawn during year.	In service, July 1, 1919.
	Feet.	*Feet.*	*Feet.*
District of Columbia	7,501	112	203,215
Chesapeake & Potomac Telephone Co.	8,490	2,497	581,349
Washington Railway & Electric Co.[1]	1,279	.....	32,423
United States Government	1,948	.....	3,484
Western Union Telegraph Co.	.....	.....	7,180
Washington Terminal Co.	.....	.....	1,019
Submarine cable	.....	.....	150
Placed in parking	.....	820	2,997
Miscellaneous	.....	.....	3,368
Total	19,218	3,429	835,185

[1] Under this name are included the conduits of all companies controlled by this corporation.

Aerial cable in service June 30, 1919.

Size of cable.	Combination.				
	Cable.	Conductors (Brown & Sharpe).			
		No. 14.		No. 19.	
		Pair.	Conductors.	Pair.	Conductors.
	Feet.	*No.*	*Feet.*	*No.*	*Feet.*
25-pair	7,358	10	147,160	15	220,740
15-pair	8,625	6	103,500	9	155,250
12-pair	9,558	6	114,696	6	114,696
8-pair	852	4	6,816	4	6,816
Total	26,393	.....	372,172	.....	497,502

In service June 30, 1919, 4.999 miles of cable, containing 164.71 miles of conductor.

TELEPHONE SYSTEM.

The following 36 telephones were added to the two switchboards of the department during the year:

District Building:

Office of Commissioner Gardiner, extension	1
Office of secretary board of commissioners (one extension) room 513	2
Office of Assistant Engineer Commissioner Brown (one extension) room 304	2
Office of health officer, room 205	1
Office of building inspector, room 106	1
Office of assessor, room 101	1
Office of surveyor, extension, room 403	1
Office of corporation counsel, corridor, fourth floor	1
Office of supervisor of city refuse, room 331-A	1
Print shop, sub-basement	1
Carpenter shop, sub-basement	1
Storeroom, sub-basement	1
Selective military service headquarters, extension, room 513	1
Selective military service, local board No. 7, room 111	1

Outside offices:	
Supervisor of city refuse, New Jersey Avenue and K Street SE	1
Garbage transfer station, extension, Second and K Streets SE	1
Playgrounds—	
Willowtree Alley	1
Garfield Park	1
Fourteenth Street and Park Road NW	1
Columbia Road, between Seventeenth and Eighteenth Streets NW	1
Health department clinic, 409 Fifteenth Street NW	3
Probation officer, police court building (one extension)	2
Public schools:	
Manual training, Eighth and I Streets NE	1
Old M Street High School	2
Chevy Chase School, extension	1
Business High School	1
Wallach School	2
Thomson School	1
Webster School	1

The following 10 telephones on these switchboards were discontinued during the year:

District Building:	
Office selective military service headquarters, room 513	3
Selective military service local boards:	
No. 4, room 403	1
No. 7, room 111	1
No. 9, corridor, first floor	1
No. 11, room 428	1
Public schools:	
Mott School	1
Berrett School	1
Garnet School	1

Fire department switchboard: One telephone was added to this switchboard during the year.

Police department switchboard: Seven telephones were added to this switchboard during the year.

Franklin School switchboard: One telephone was added to this switchboard during the year.

McKinley Manual Training School switchboard: One telephone was added to this switchboard during the year.

James Ormond Wilson Normal School: One telephone was added to this switchboard during the year.

Public Library switchboard: One telephone was added to this switchboard during the year.

Number of telephones connected to the District system July 1, 1919.

Offices of the District building	196
Outside offices and institutions	94
Residences	3
Public schools	223
Fire department	57
Police department	60
Water department, private branch exchange	42
Franklin School, private branch exchange	37
Western High School, private branch exchange	17
McKinley Manual Training School, private branch exchange	17
James Ormond Wilson Normal School, private branch exchange	30
Miner Normal School, private branch exchange	12
New Central High School, private branch exchange	36
Dunbar High School, private branch exchange	18
Public Library, private branch exchange	21
Washington Asylum and Jail, private branch exchange	17
Municipal Court, private branch exchange	6
District repair shop, private branch exchange	6
Police-patrol service	465
Total	1,357

There are 27 portable telephone sets in service, the property of the District of Columbia. These instruments are used by the fire department and the employees of the electrical department.

STORAGE BATTERY SYSTEM.

The number of cells of storage battery in service July 1, 1919, was as follows:

On fire-alarm circuits	1,862
On patrol circuits	226
On local circuits	86
Total	2,174

DISTRICT UNDERGROUND CONDUIT AND CABLE SYSTEM.

The following conduit connections were made to the underground system:

Fire-alarm posts (total, 4).

Twentieth and G Streets NW.
Fourteenth and Buchanan Streets NW.
Wisconsin Avenue and Porter Street NW.
Fourteenth and Otis Streets NW.

Patrol posts (total, 1).

Twenty-seventh Street and Woodley Road NW.

Connections to buildings (total, 1).

Eighth and I Streets NE.

In making the above-mentioned connections and extensions 108 feet of conduit (duct feet) were constructed, the work being done by this department.

Connections to the underground system, July 1, 1919.

Fire-alarm posts	445	United States Government buildings	24
Police-patrol posts	354	Private buildings	61
Cable terminal posts	6	Cable poles	65
Schoolhouses	80		
Fire-department houses	34		
Police station houses	13	Total	1,101
Miscellaneous District buildings	19		

POLICE PATROL SYSTEM.

The following changes and new installations were made in the patrol system:

Sixth Precinct.—New installation, connected underground; box No. 27, Fourth and E Streets NW.

Tenth Precinct.—New installation, connected overhead; box No. 19, Fifteenth and Dahlia Streets NW.

Eleventh Precinct.—Changed from overhead to underground connection; box No. 25, Fourteenth and U Streets SE.; box No. 26, Fifteenth and V Streets SE.; box No. 54, Thirteenth and W Streets SE.

Subprecinct, Tenallytown.—New installation, connected underground; box No. 33, Twenty-seventh Street and Woodley Road NW.

On July 1, 1919, the distribution of boxes among the precincts was as follows:

	Wall boxes.		Booths.	Total.
	Underground.	Overhead.		
First	37			37
Second	27			27
Third	50			50
Fourth	37	2		39
Fifth	44	2		46
Sixth	29			29
Seventh	22	3		25
Eighth	27			27
Ninth	34	18		52
Tenth	49	10	1	60
Eleventh	3	34	1	38
Subprecinct, Tennallytown	10	19	1	30
Total	[1] 369	88	3	460

[1] Six of these boxes at following locations are not on posts: 3, Union Station; 1, engineer stables, First and Canal Streets; 1, Takoma Park, watch box; 1, Treasury Department.

FIRE-ALARM SYSTEM.

Thirty-nine fire-alarm boxes were placed in service during the year, 24 public and 15 private boxes, located as follows:

Public boxes.

No. 364, Twentieth and G Streets NW.
No. 371, Eighteenth and D Streets NW.
No. 743, Forty-seventh and Fessenden Streets NW.
No. 744, Wisconsin Avenue and Porter Street NW.
No. 746, Belt Road and Ingomar Street NW.
No. 747, Thirty-third and Rittenhouse Streets NW.
No. 748, Conduit Road and Reservoir Street NW.
No. 749 Conduit Road and Jewett Street NW.
No. 915, Fifteenth and U Streets SE.
No. 977, Thirty-sixth Street and Benning Road NE.
No. 992, Forty-eighth and Meade Streets NE.
No. 6177, Bladensburg Road and Douglas Street NE.
No. 6185, Fifteenth and Irving Streets NE.
No. 6186, Thirteenth and Newton Streets NE.
No. 6187, Fourteenth and Monroe Streets NE.
No. 6188, Twelfth and Perry Streets NE.
No. 6189, Thirteenth and Quincy Streets NE.
No. 6191, Eighteenth and Lawrence Streets NE.
No. 8161, Fourteenth and Otis Streets NW.
No. 8164, Fourteenth and Buchanan Streets NW.
No. 8176, Thirteenth and Dogwood Streets NW.
No. 8177, Thirteenth and Geranium Streets NW.
No. 8191, Third and Rittenhouse Streets NE.
No. 8192, Blair and Bates Roads NW.

Private boxes.

No. 61, Administration building, War Workers' Dormitories, Union Station Plaza.
No. 66, Administration building, War Workers' Dormitories, North Capitol Street between B and C Streets NE.
No. 398, Navy Department Building, Potomac Park NW.
No. 399, War Department Building, Potomac Park NW.
No. 468, United States Government building "D," between Maine and Missouri Avenues, Four-and-a-half and Sixth Streets (west).
No. 469, United States Government building "E," between Maine and Missouri Avenues, Four-and-a-half, and Sixth Streets (west).
No. 474, United States Government building "F," Seventh Street between B Street north and south (west).

No. 485, Enlisted men's barracks, East Potomac Park.

No. 489, Smithsonian Building, near Tenth and B Streets SW.

No. 536, United State Navy Yard, Fourth and M Streets SE., at entrance.

No. 585, Washington Gas Light Co. plant, Twelfth Street between M and N Streets SE.

No. 592, United States Public Health Service, New Jersey Avenue and B Street SE.

No. 797, Experimental Station, Bureau of Mines, American University.

No. 1227, Palace Theater, 1306 F Street NW.

No. 1289, New National Museum Building, Tenth and B Streets NW.

One private box, No. 454, located at the Norfolk and Washington Steamboat wharf, foot of Seventh Street SW., was discontinued during the year.

During the year three boxes were changed from overhead to underground connection.

Fire-alarm boxes in service.

	July 1, 1918.	July 1, 1919.
Connected by overhead wires:		
Public boxes	65	80
Private boxes	21	22
Connected by underground wires:		
Public boxes	436	445
Private boxes	115	128
Total	637	675

Alarms received and transmitted.

Regular box alarms	1,111
Alarms received from telephone stations	3
Local alarms	1,110
Second alarms	20
Third alarms	3
Fourth alarms	1
Fifth alarms	0
Sixth alarms	0
Total	2,248
False box alarms	246
False local alarms	46

Each fire-alarm box was tested several times during the year, the contact points cleaned and the mechanism overhauled. This is done regularly once a month as far as possible. The total number of tests amounted to 3,334, being an average of 4.939 per box.

Alarms received by the month.

	Box.		Local.		Additional alarms.
	Number.	False.	Number.	False.	
1918.					
July	60	3	75	1	[illegible]
August	67	5	79	2	[illegible]
September	67	17	61	5	[illegible]
October	115	25	86	1	
November	139	48	150	1	
December	95	26	118	6	
1919.					
January	123	34	84	3	.....
February	114	26	109	3	
March	88	16	135	5	.....
April	100	16	103	5	
May	74	20	57	5	
June	72	10	53	9	.....
Total	1,114	246	1,110	46	[illegible]

POLES.

Under the authority of the act of Congress, approved June 30, 1902, regulating the use of telephone wires in the District of Columbia, the Chesapeake & Potomac Telephone Co. has reported the following amount of work done during the fiscal year:

Poles erected in alleys within the prescribed area:		
Line	7	
Guy	3	
Anchors	3	
		13
Poles erected in streets outside the prescribed area:		
Line	29	
Guy	8	
Anchors	13	
		50
Poles erected in alleys outside the prescribed area:		
Line	39	
Guy	13	
Anchors	24	
		76
Total		139
Poles taken down in alleys within the prescribed area:		
Line	8	
Guy	1	
Anchors	2	
		11
Poles taken down in streets outside the prescribed area: Line		13
Poles taken down in alleys outside the prescribed area:		
Line	11	
Guy	4	
Anchors	4	
		19
Total		43
Total erected during the year		139
Total taken down during the year		43
Net increase		96

Miscellaneous pole work—poles erected, taken down, moved, etc.

	Erected.			Taken down.			Moved.		Replaced.		Reset.		Increase.		Decrease.	
	Line.	Guy.	Anchor.	Line.	Guy.	Anchor.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.
Chesapeake & Potomac Telephone Co	75	24	40	32	5	6	35	2	64	2	24		43	19		
Potomac Electric Power Co	142	13	18	2	1	8							140	12		
Western Union Telegraph Co	4												4			
Postal Telegraph-Cable Co							4									
Capital Traction Co							1		3							
City & Suburban Ry. Co		2												2		
Georgetown & Tennallytown Ry. Co									3							
East Washington Heights Traction Ry. Co							1									
Brightwood Ry. Co								3								
Total	221	39	58	34	6	14	41	5	70	2	24		187	33		

List of poles of all kinds, July 1, 1919.

	Line.	Guy.	Total.		Line.	Guy.	Total.
District of Columbia	460	13	473	Washington & Maryland Ry. Co.	158	.....	158
United States Government	297	1	298	Georgetown & Tenleytown Ry. Co.	304	.....	304
Chesapeake & Potomac Te.e-phone Co	6,457	688	7,145	Washington Interurban R. R. Co.	187	4	191
Potomac Electric Power Co	6,641	259	6,900	East Washington Heights Traction R. R. Co	65	.....	65
Western Union Te egraph Co.	912	.....	912	Brightwood Ry. Co	341	.....	341
Postal Te egraph-Cab e Co	355	9	364	Washington & Glen Echo Ry. Co.	8	.....	8
Baltimore & Washington Transit Co.	30	.....	30	Capital Ry. Co	208	.....	208
Capital Traction Co	204	.....	204	Total	18,123	981	19,104
City & Suburban Ry. Co	87	2	89				
Washington & Great Falls R. R. Co	401	1	402				
Columbia Ry. Co	463	4	467				
Steam rai.roads	545	.....	545				

ELECTRICAL WIRING INSPECTIONS.

The following tables show the amount of work performed by this department in connection with electric-wiring inspections:

Notices received from the inspector of buildings of permits indicating electric wiring:	
Building	954
Machinery	259
Signs	12
Total	1,225
Permits issued by the electrical department for installations:	
Without fee (ordered by District of Columbia, etc.)	168
Covered by building permits	958
Not covered by building permits	2,203
For temporary work	37
Quarterly (maintenance of plants, etc.)	43
	3,409
For temporary use of current	200
Total	3,609
Certificates issued:	
Final (including 17 without fee)	2,708
Preliminary	1
Total	2,709

Lamps and apparatus installed.	Number.	Approximate kilowatts.
Lamps, incandescent	60,757	2,430
Lamps, arc	16	88
Motors	686	4,164
Devices, miscellaneous	5,910	738
Blank outlets	128	.....
Total	67,497	7,420

Defective wiring discovered and reported by inspectors, extra of routine inspection work	531
Notices of defective wiring sent	1,219
Requests for inspection (not related to work already under permit)	323

Miscellaneous jackets (specifications, etc., for District of Columbia work, etc.)	343
Notices received from the superintendent of licenses, leading to original inspection or periodic (annual) reinspection of theaters, hotels, assembly halls, etc	173
Work of inspectors of electric wiring from July 1, 1918, to June 30, 1919:	
Inspections in private buildings (not including theaters and moving-picture theaters)	10,896
Inspections in municipal buildings	197
Inspections in United States Government buildings	4
Inspections in theaters (including moving-picture theaters), including reinspections, periodic (annual) and occasional, of moving-picture theaters (more frequent periodic inspections being made by the fire marshal), and periodic reinspections (weekly or more frequently if bill changes) of theaters	740
Total	11,837

Fees paid to the collector of taxes:	
For permits	$5,709.00
For one copy of Electric Wiring Rules and Regulations	.30
Total	5,709.30
Electric Wiring Rules and Regulations issued without fee	3

MISCELLANEOUS WORK.

This department prepared plans and specifications for and supervised the introduction of electric wiring in the following municipal properties:

Completed work.

Temporary kitchen, Washington Asylum and Hospital, lighting.
Municipal asphalt plant, lighting.

Specifications prepared—work not started.

Webster School, lighting plans.
McKinley Manual Training School, lighting fixtures in auditorium.
No. 22 engine company, District of Columbia fire department, lighting wiring and fixtures.
Engineer department stables, extension of lighting wiring.
Anacostia Bridge, power switchboard.
Municipal fish market, changes and additions to lighting and power wiring.
Home for Aged and Infirm, Blue Plains, D. C., generator panel.

Work in progress.

M Street High School, Curtis School, and Cleveland School, lighting and power in dental clinic rooms.
O Street Vocational School, lighting fixtures.
Head house and wharf, Norfolk & Washington Steamboat Co., lighting wiring, fixtures and telephone.

Numerous preliminary plans, specifications, and estimates were prepared for various proposed lighting and power projects in a number of District buildings.

Various troubles with lighting and power installations in District buildings were investigated and remedied.

GENERAL SUPPLIES.

Receipts.

Appropriation	$15,000.00
Deficiency appropriation	2,300.00
Repayments	3,538.99
Total	20,838.99

Expenditures.

Labor pay roll	$2,327.62
Office expenses	1,110.02
Telephone rental, etc	5,900.72
Instruments and apparatus	898.71
Storeroom expenses	2.51
Stable expenses	11.44
Wire and cable	2,555.68
Line supplies	476.40
Tools and hardware	96.23
Batteries and battery supplies	998.92
Repairs to cuts	43.78
Paints	33.19
Car tickets	50.00
Drayage and expressage	34.59
Allowance for maintenance of automobiles	467.42
Patrol-box keys	47.00
Maintenance of fire-alarm apparatus	748.08
Repairing lanterns	32.00
Fire-alarm boxes	1,204.50
Posts, etc	417.00
Remodeling storehouse	600.00
Miscellaneous items	13.78
Total	18,069.59

LIGHTING.

Receipts.

Appropriation	$415,000.00
Repayments by Baltimore & Ohio R. R. Co	348.92
Repayments by Georgetown Barge, Dock, Elevator & R. R. Co	543.87
Repayments by Washington Terminal Co.[1]	4,331.25
Repayments by Philadelphia, Baltimore & Washington R. R .Co.[1]	5,873.38
Repayments, miscellaneous	147.69
Total	426,245.11

Expenditures.

Mantle gas lighting:		
Washington Gas Light Co	$168,624.10	
Deductions for defective service	470.37	
		168,153.73
Georgetown Gas Light Co	10,511.76	
Deductions for defective service	16.32	
		10,495.44
Repayment Office Public Buildings and Grounds		13.96
Incandescent electric lighting:		
Potomac Electric Power Co	147,859.37	
Deductions for defective service	2,434.45	
		145,424.92
Electric arc lighting:		
Potomac Electric Power Co	63,430.15	
Deductions commissioner's order July 15, 1915	1,806.48	
Deductions for defective service	665.47	
		60,958.20
Street designation lighting:		
Washington Gas Light Co	3,670.55	
Deductions for defective service	1.89	
		3,668.66
Georgetown Gas Light Co		259.99
Potomac Electric Power Co	1,286.74	
Deductions for defective service	.70	
		1,286.04

[1] Due but not paid.

Labor pay roll	$4,657.30
Storeroom rental	700.00
Allotment Inspector Dawson	344.40
Repairs to cuts	4.18
Traveling expenses	19.57
Remodeling storehouse	1,062.65
Baist Atlas	50.00
Blue printing	51.66
Repairing lamps	108.75
Patterns	143.75
Lamp-posts, globes, etc	12,607.00
Expressage and freight	10.00
Storeroom expenses	81.58
Street sign frames, etc	51.85
Car tickets	150.00
Tools and hardware	31.34
Stable expenses	232.16
Paints, oils, etc	101.63
Erecting, moving, and taking down posts	139.00
Street crossing lighting	230.04
Total	411,037.80

WIRES UNDERGROUND.

Receipts.

Appropriation	5,000.00
Repayments	30.02
Total	5,030.02

Expenditures.

Labor pay roll	283.12
Cable	1,592.72
Posts, etc	770.50
Line supplies	1,349.32
Remodeling storehouse	150.00
Blue printing	.63
Total	4,146.29

EXTENSIONS OF POLICE PATROL.

Receipts.

Appropriation	2,500.00

Expenditures.

Labor pay roll	236.06
Police patrol boxes	78.00
Posts for patrol boxes	330.00
Cable	909.00
Remodeling storehouse	75.00
Total	1,628.06

FIRE-ALARM BOXES.

Receipts.

Appropriation	$5,000.00

Expenditures.

Labor pay roll	$171.00
Fire-alarm boxes	3,813.00
Posts for fire-alarm boxes	434.00
Cable	270.00
Line supplies	293.75
Total	4,981.75

ONE MOTOR-TRUCK EXCHANGE.

Receipts.

Appropriation	$2,000.00

Expenditures.

One motor vehicle, Ford	682.00

REPORT OF THE CHIEF CLERK OF THE ENGINEER DEPARTMENT.

WASHINGTON, D. C., *October 8, 1919.*

SIR: I have the honor to submit the following report of operations in this office for the fiscal year ended June 30, 1919:

Communications received, briefed, recorded, and indexed	10,805
Vouchers prepared and recorded	315
Contracts drawn and indexed	200
Bonds approved and indexed	285

DANIEL E. GARGES,
Chief Clerk, Engineer Department.

The ENGINEER COMMISSIONER.

REPORT OF THE WHARF COMMITTEE.

WASHINGTON, *July 21, 1919.*

SIR: The wharf committee has the honor to submit the following report for the fiscal year ended June 30, 1919:

Accompanying is a list of wharf property now under lease.

All of the leases for these wharves expired during the year and were renewed. The table shows the date of expiration of the new lease in each case. The rentals are fixed by competitive bidding after public advertisement.

The largest amount of wharf property is that along the Washington Channel. This has a total frontage on the city side of 9,275 linear feet, of which 4,675 linear feet between the Army War College and the south curb line of N Street is under the jurisdiction of the Chief of Engineers, United States Army. A portion of this is used for governmental purposes and a portion is under lease. Of the remaining 4,600 feet between the south curb line of N Street south and Fourteenth Street SW., 559 feet between Thirteenth and Fourteenth Streets is under the jurisdiction of the United States and 4,021 feet under the jurisdiction of the commissioners. Located along this frontage are the harbor police station, the dock of the harbor boat, the house and dock of the fire boat, the District morgue, a District property yard, and the municipal fish wharf and market.

The frontage between Thirteenth and Fourteenth Streets is the site of the central heat, light, and power plant for furnishing light and power to governmental buildings. This plant has not yet been constructed.

Along the Anacostia River front the United States Navy Yard occupies the frontage on the city side from Second to Eleventh Streets, and the sewerage pumping station and yard occupies the frontage between First and Second Streets. At the foot of First Street is located an intake for the Capitol power plant. There are only two privately rented frontages. One of these is at Twelfth and N Streets SE. This frontage is a part of the Anacostia Park under the jurisdiction of the District Engineer. The lease for this frontage is a tempo-

rary monthly lease at the pleasure of the District Engineer. The other is the water frontage between the building lines of Q Street SW. leased to the Standard Oil Co.

The water frontage leased to private parties is used for the following purposes: namely,

Wood yards, lumberyards, marine railways, commercial and pleasure boat traffic, and other commercial uses. The recent proposals received for leasing the water fronts do not indicate that there is much demand for water frontage.

The wharf property along the Georgetown Channel of the Potomac River is under private control with the exception of the foot of streets. The foot of one street only is leased by the District of Columbia.

On September 2, 1918, the wharf leased to the Norfolk & Washington Steamboat Co., including the structures thereon, was practically destroyed by fire and the steamboat company was given the use of the old ferry wharf until the necessary reconstruction of the wharf and structures could be effected. This is now being done from the amount received from the insurance and from an appropriation made by Congress for constructing headhouse and sheds.

Respectfully submitted.

DANIEL E. GARGES, *Chairman*,
D. E. McCOMB,
RUSSELL DEAN,
Wharf Committee.

To the ENGINEER COMMISSIONER.

List of wharf property under lease June 30, 1919.

POTOMAC RIVER FRONT.

Name of lessee.	Location.	Expires.	Water frontage.	Area.	Rental per year.
			Lin. ft.	*Sq. ft.*	
Capital Yacht Club	Foot of Ninth Street SW., between structures 39 and 41.	July 1,1923	24	2,080	$75.00
L. A. Clarke & Son	Sec. 2, structures 68 to 77, including 704, foot of Tenth Street SW.	Aug. 1,1923	280	45,000	1,500.00
Colonial Beach Co.	Sec. 1, structures 30 to 37, inclusive, Water Street between M and N Streets.	Mar. 15,1923	132	8,000	600.00
Do	Sec. 1, structures 26 to 30, inclusive, foot of N Street SW.	May 15,1923	120	7,000	600.00
Cranford Paving Co.	Foot of Thirty-first Street NW.	Feb. 1,1923	53	.....	531.60
J. Maury Dove Co. (Inc.).	Sec. 3, structures 12 to 20, foot of Thirteenth Street SW.	Nov. 8,1919	168	38,000	2,100.00
G. W. Forsberg	Sec. 2, structures 22 to 32, inclusive, foot of Eighth Street SW.	Mar. 14,1922	.....	.....	733.00
Johnson & Wimsatt	Sec. 3, structures 5 to 11, inclusive, foot of Twelfth Street SW.	Mar. 15,1923	190	43,500	2,241.00
Do	Sec. 2, structures 34 and 35, foot of Ninth Street SW.	.....do.....	80	18,000	720.00
George E. Klein	Sec. 2, structures 39 and 40, foot of Ninth Street SW.	Mar. 14,1924	40	2,400	110.00
Mount Vernon & Marshall Hall Steamboat Co.	Sec. 1, structures 59, 62, 63, and 64, foot of M Street SW.	Mar. 15,1923	125	10,000	630.00
Norfolk & Washington Steamboat Co.	Sec. 1, structures 60 and 65 to 72, inclusive, foot of Seventh Street SW.	Dec. 31,1921	190	35,600	2,447.00
Potomac & Chesapeake Steamboat Co.	Sec. 2, structures 11 to 21, inclusive, foot of Eighth Street SW.	Mar. 15,1923	198	35,600	1,200.00
Wm. A. Ragan	Sec. 3, structures 21 and 22, foot of Thirteenth Street SW.	Mar. 15,1921	65	4,200	100.00
Do	Sec. 3, structure 23, foot of Thirteenth Street SW.	May 1,1921	18	1,440	50.00
Chas. E. Sanford et al.	Sec. 2, structures 36, 37, and 38, foot of Ninth Street SW.	Mar. 15,1921	44	3,320	130.00
Jos. P. Stephenson, Stephenson & Bro.	Sec. 2, structures 1 to 10, inclusive, foot of Seventh Street SW.	Jan. 31,1922	300	59,900	2,402.00
A. M. Suit	Wharf slip, foot of Ninth Street SW., between District sand wharf and Capital Yacht Club.	June 14,1921	.....	.....	100.00
District of Columbia municipal fish wharf and net.	Sec. 2, structures 78 to 82, inclusive, and 85 to 97, inclusive, structures 98 to 120, inclusive.	.....	700	152,100	.....
Do	Sec. 3, structures 1 to 4, inclusive, Water Street between Tenth and Twelfth Streets SW.	.....	126	11,015	.....

List of wharf property under lease June 30, 1919—Continued.

POTOMAC RIVER FRONT—Continued.

Name of lessee.	Location.	Expires.	Water frontage.	Area.	Rental per year.
			Lin. ft.	*Sq. ft.*	
Property yard	All water frontage on Water Street between H and I Streets SW.		503	90,370	
Fire-boat wharf	Sec. 1, structures 39 and 40, Water Street between N and M Streets.				
Morgue	Sec. 1, structures 41 and 42, Water Street between N and M Streets.				
Harbor master's wharf	Sec. 1, structure 38, and section 2, slip between structures 41 and 42.				
United States site of central heat and power plant.	Water Street between Thirteen-and-a-half and Fourteenth Streets SW.		359	38,975	
Do	Sec. 3, structures 24 to 27, inclusive, foot of Thirteenth Street SW.		200	26,600	
Total					$16,395.60

ANACOSTIA RIVER FRONT (EASTERN BRANCH).

Edward S. Dean	Waterfront between the lines of N Street SE.	Monthly			$67.50
Standard Oil Co	Waterfront between building lines of Q Street SW.	Dec. 31, 1921			255.00
District of Columbia sewer division.	Foot of First Street SE., opposite lot 1, square south of square 744.		330		
United States Superintendent of Capitol Buildings and Grounds.	Foot of First Street SE., opposite square south of square 744.		40		
Total					322.50

REPORT OF THE SUPERINTENDENT OF THE DISTRICT BUILDING.

WASHINGTON, D. C., *August 19, 1919.*

SIR: I have the honor to submit the following report on the "Care of the District Building" for the fiscal year ending June 30, 1919.

The routine work incident to the care of the District Building involves several distinct functions, namely, the power plant, woodworking, paint, and electrical shops; blue-print and photograph shop; printing shop; and the elevator, watch, and cleaning forces.

Power plant.—Total number of tons of coal consumed was 1,914.5, a decrease of 398.5 tons compared with the fiscal year ending June 30, 1918, due to the mild winter and to lower per cent of ash, which ran 15 per cent as compared with 20 per cent for fiscal year ending June 30, 1918. Total number of hours the heating system was in operation, 9 months 4,790 hours. Total number of hours live steam was used for heating the building 9 months 400 hours. Total number of hours ventilation, 880. Total number of hours refrigeration, 2,043. Total number of hours pneumatic-tube system was in operation, 2,172. Total number of kilowatt hours consumed 430,050. Total number of kilowatt hours used for lighting, 285,300. Total number of kilowatt hours used for power, 144,750. Total number of kilowatt hours used for elevators, 56,590. Because of shortage of labor it was necessary to discontinue operation of the power plant from 6 p. m. until 5 a. m. for a period of three months, July 1 to October 8. During this period 21,640 kilowatt hours, at $0.025 per kilowatt hour, were purchased from the Potomac Electric Power Co. There were 742 cubic yards of ash removed at a cost of $1,155.50. Necessary repairs to the power plant were made as follows: One set of grate bars replaced, two furnaces relined, repairs to engines, replacing of steam joint clamps and asbestos blocks, walls of engine and boiler rooms repainted. We installed one new boiler feed pump, a pneumatic tube line from the central station to room

No. 117 for use of the assessor, and new plumbing for the electrical and police departments.

Woodworking and paint shop.—This department has made general repairs to the building so far as funds would permit. There were alterations to offices, building of partitions, cutting walls, refinishing of floors, repainting of walls, and the office of the municipal garage reconstructed.

Electrical.—In this department separate lines were installed from the engine room to the health and police department print shop for supplying power. The installation of necessary switches, bus bars, and meters made it possible to determine the consumption of power, for other than lighting, by the following departments: Health department consumed 57,280 kilowatt hours; electrical department consumed 28,398 kilowatt hours; police department consumed 2,895 kilowatt hours; fire department consumed 770 kilowatt hours; making a total of 89,343 kilowatt hours consumed by these departments; 30 lighting fixtures have been changed from the direct to the semidirect; elevators, electric fans, lighting, and batteries for the municipal garage as well as the District Building were efficiently cared for.

Print shop.—Six hundred and one orders for the various departments, totaling 1,258,071 pieces of printed matter, were completed, together with cutting, stitching, stapling, and padding, at a total cost of $8,724.28, an increase of $3,951.77, as compared with the fiscal year ending June 30, 1918.

Blue-print and photograph shop.—Thirty-two thousand and ninety-nine square feet of blue printing were completed at a cost of $1,022.93. Six hundred and thirty-one photographs were completed at a cost of $250.64, making a total of $1,273.57.

F. S. BESSON,
Captain, Corps of Engineers, United States Army,
Superintendent.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA
(Through the Engineer Commissioner).

REPORT OF THE BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS.

WASHINGTON, *October 7, 1919.*

GENTLEMEN: We have the honor to submit the following report for the year ended June 30, 1919.

Buildings on which action was taken in response to notices served under the act creating the Board for the Condemnation of Insanitary Buildings during the year ended June 30, 1919:

	Examined.	Demolished.	Repaired	No action necessary.	Value of repairs.	Pending.
Buildings in streets	210	60	43	75	$11,850	12
Buildings in alleys	116	32	23	61	3,900	20
Buildings condemned under section 16 of building code:						
Buildings in streets	15	11				4
Buildings in alleys	15	13				2
Total	356	116	66	136	15,750	38

Buildings acted upon since the creation of the Board for the Condemnation of Insanitary Buildings up to and including June 30, 1919.

	Examined.	Demolished.	Repaired.	No action necessary.	Estimated value repairs during fiscal year 1918-19.
Buildings in streets	3,180	1,529	1,134	421	$18,950
Buildings in alleys	4,104	736	566	2,802	4,075
Total	7,284	2,265	1,700	3,223	23,025

Number of meetings of the Board for the Condemnation of Insanitary Buildings during the year ended June 30, 1919	9
Number of preliminary notices served for the year ended June 30, 1919	84
Condemnation notices served	29
Condemnation notices affixed to buildings	35
Condemnation notices served under section 16 of the building code	40
Inspections and miscellaneous visits made in connection with the service of notices	2,385
Estimated number of tenants required to secure other living quarters through action on the part of the Board for the Condemnation of Insanitary Buildings since the creation of the board	6,510
Estimated number of tenants benefited by repairs for the year ended June 30, 1919	330
Estimated number of tenants benefited by repairs since the creation of the board	5,796
Estimated value of repairs required through action on the part of the Board for the Condemnation of Insanitary Buildings for the year ended June 30, 1919	$15,750

The act of Congress approved September 25, 1914, declaring the use or occupation of any building or other structure erected or placed on or along any alley as a dwelling or residence or place of abode by any person or persons is injurious to life, to public health, morals, safety, and welfare of the District of Columbia; and such use or occupation of any such building or other structure on, from and after the 1st day of July, 1918, shall be unlawful; was amended by an act of Congress approved May 23, 1918, which amendment provides, "That the operation of the second paragraph of section 1 (relating to the use or occupation of alley buildings as dwellings) * * * in the same hereby is postponed until the expiration of one year following the date of the proclamation by the President of the exchange of the ratifications of the treaty of peace between the United States and the Imperial German Government."

There is being made at this time a careful study of conditions in the alleys of the city, and a census is being taken of the inhabitants of the same; an inspection and enumeration is also being made of the alley buildings; this survey of the alleys' conditions and buildings is being made with the view of correctly determining the number of dwellings now occupied as such, and the number of alley dwellers, also the number of alley dwellings demolished or converted to some other use since the creation of the Board for the Condemnation of Insanitary Buildings; also to determine the feasibility of extending some of the existing 30-foot alleys now used for dwellings to the abutting streets making minor streets of the same.

Attention is invited to the item of repairs to alley dwellings; the greater part of these repairs consisted of converting alley dwellings into garages, thereby increasing the rental value of the same.

CAREY H. BROWN,
Captain, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.
W. C. FOWLER, M. D.,
Health Officer, District of Columbia.
JOHN P. HEALY,
Inspector of Buildings, District of Columbia,
Board for the Condemnation of Insanitary Buildings.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

APPENDIX.

CATIONS FOR PAVING STREETS AND AVENUES WITH SHEET ASPHAT AND CONSTRUCTING CEMENT CONCRETE ROADWAYS.

SHEET ASPHALT.

ork.—The work to be done under this proposal and contract will consist ng with sheet asphalt the streets, avenues, and roads named in paragraph arts thereof, or doing any portion of such work, as may be ordered in by the Commissioners of the District of Columbia.

nounts.—The streets and avenues expected to be so improved and the imate quantities of work of each are as follows: (On file in office of er Commissioner, District of Columbia.)

bidder may state the period following the award of contract within work will be commenced, otherwise it will be 30 days.

order of work on the streets, roads, and avenues named will be as di- by the Engineer Commissioner.

work must be so conducted that the entire work will be completed before 1920; unless otherwise authorized by the Engineer Commissioner.

will be scheduled on the basis of the prices named for pavements with a concrete base, but the prices named for a 5-inch base will be incorporated contract and such work as may be so directed will be executed and paid such.

ds.—The contractor will, for the prices bid, do all the work prescribed e specifications; do all the necessary grading and trimming of the road- d all rolling; provide bridges, fences, and other means of maintaining on intersecting streets, roads, and railroads, and all private driveways iving due notice to parties affected thereby; maintain the same in good e condition as long as may be necessary, and then remove such temporary nts and restore such roads to their proper condition; provide watchmen, fences, and other precautionary measures necessary to the protection of and property; furnish all materials (except as specified) and all tools plements, labor and transportation required to lay and put in complete or use the specified pavement; and do each and all of these to the satis- of the engineer. Upon the completion of the work he will remove any ary structures erected during the progress of the work, and restore all s, pavements and parkings, both public and private, to satisfactory con-

d material.—Old material removed from the streets will be the property District of Columbia, and the work of removal will be paid for at prices in paragraph 14 of these specifications. Granite blocks, cobble, old tc., must be removed to the nearest property yard or to such other places engineer may direct.

rading and *subgrade.*—Lines and grades will be established by the engi- and no work will be commenced until these are given. The area over the pavement is to be laid must be excavated to the proper depth below rface of the pavement when completed, any objectionable or unsuitable below the bed being removed to such depth as may be directed by the er and the space filled with suitable material thoroughly compacted. The after being trimmed so as to be parallel to the surface of the pavement completed, will be thoroughly compacted by rolling, with a roller weighing ss than 5 tons, and by heavy ramming at places which can not be reached e roller, dampening the bed before rolling and ramming, if required, to

the satisfaction of the engineer. No extra allowance will be made for trimming or rolling, but the volume of earth, etc., removed will be paid for as grading of its class. Any filling will be done in layers not exceeding twelve (12) inches in thickness, and all materials used for this purpose will be subject to approval. If improper or unsuitable material be used, it will be removed at the cost of the contractor. All measurements will be made in place, and payments made thereon. Should the grading involve work in both "cut" and "fill," the measurement of it will be computed on the basis of the volume of the material in place in the "cut" only; the excavated material from the "cut" section deposited in the "fill" will not be again paid for as "fill." Should the amount of cut on the street not suffice to make the necessary fill, the amount borrowed from other designated localities will be paid for as grading.

6. *Six-inch concrete base.*—Upon the bed prepared as described in paragraph 5, there will be laid 6-inch foundations of concrete as directed, made of the following materials by volume: 1 part Portland cement, 3 parts sand, 7 parts gravel.

Broken stone, run of the crusher, may be substituted for part or all of the gravel at the option of the contractor.

(*a*) *Cement.*—The cement used will be a standard brand of Portland cement, uninjured by age or exposure, and delivered at the work in original undamaged packages. The right is reserved to reject any cement that has not established itself as a high-grade Portland cement and has not been made by the same mill for two yars and given satisfaction in use for at least one year under climatic and other conditions of at least equal severity as those of the work proposed. The contractor shall keep the cement in store, under proper cover, in the city of Washington, and shall properly protect it until used. The engineer shall have the right to test the cement as he judges necessary and to reject any or all lots. The cement, after being accepted, can not be transferred or used by the contractor on other work without the consent of the Engineer Commissioner. The cement while in storage or upon the work or while being hauled upon the work, shall be properly protected, and no cement shall be used which, in the opinion of the engineer, has been injured by age or exposure.

No cement shall be used upon the work until it has been tested in the office of the Engineer Commissioner and accepted by him, the tests to extend over such length of time, not exceeding 28 days, as the Engineer Commissioner may think necessary.

Cement furnished by the contractor that has been tested and accepted by the Bureau of Standards, and that is identified as such, will be subject only to the following retests by the District of Columbia: Firmness, initial set, hard set, 24-hour tensile.

(*b*) *Sand.*—The sand used shall be clean, sharp, river or pit sand, containing both fine and coarse grains, but free from sewage, mud, clay, mica, paper, leaves, chips, or other foreign matter, and not showing when shaken with water and after subsidence, more than 5 per cent by volume, of silt.

(*c*) *Broken stone.*—Stone used in concrete must be hard, durable, and properly broken to a size small enough to pass through a ring 2 inches in diameter when the run of the crusher is substituted for gravel. The run of the crusher shall not contain over 1 per cent of material passing a No. 10 sieve. The stone shall be thoroughly cleansed from all foreign substance, and shall be screened and washed, if so ordered by the engineer. Sand, detritus, or any material other than hard, angular fragments of stone will be considered foreign substances.

(*d*) *Gravel.*—Gravel shall be clean, washed gravel, and shall not contain pebbles greater than 2 inches in their largest dimensions, and shall run from that down to pea size, well graduated.

(*e*) *Water.*—Water used for mortar and concrete shall be fresh and clean, free from earth, dirt, or sewage and shall be used in such quantity as the engineer may direct.

(*f*) *Platforms.*—Platforms shall be provided if so ordered by the engineer upon which all sand, gravel, and broken stone for concrete shall be placed when brought upon the line of work, and kept there until used.

(*g*) *Mixing.*—The thorough mixing and incorporation of all material will be insisted upon. If done by hand labor the dry cement and sand shall be turned over and mixed with shovels by skilled workmen not less than six times before the water is added; the stone or gravel, after being drenched with water shall be added to the mixed sand and cement; the drenching shall not be done while the stone or gravel is in the wheelbarrow; the whole mass shall be thoroughly

turned over with shovels, not less than four times, and mixed upon a water-tight platform until every particle of stone or gravel is completely enveloped with mortar. The whole operation of mixing and laying each batch shall be performed as expeditiously as possible, by the aid of machinery, or a sufficient number of skilled men. If the concrete is mixed in batches requiring one barrel of cement, the platform must not be smaller than 10 by 12 feet, nor will a larger amount of concrete than can be made with one barrel of cement be allowed to be mixed in one batch by hand. In mixing by machinery the materials must be so delivered as to insure a uniform product of the specified proportions of all ingredients to the satisfaction of the engineer, and for this purpose the mixer shall be revolved for at least one minute for each batch.

(*h*) *Setting.*—Concrete shall not be used after it has begun to show evidence of setting. No concrete which has once set shall be used as material for mixing a new batch.

Each batch of concrete after being mixed shall be spread in place in horizontal layers by means of shovels so as to give the requisite thickness after being tamped and shall then be thoroughly compacted. Any evidence of lack of compaction will be regarded as sufficient reasons for removal and replacement of the base. Hauling over base less than three days old will not be allowed unless planks are laid.

7. *Five-inch concrete base.*—All provisions of the specifications for a 6-inch concrete base shall apply to a 5-inch concrete base which shall differ from the 6-inch base only in respect to the thickness thereof and the price paid therefor.

SHEET-ASPHALT PAVEMENT.

8. *Asphalt binder.*—The binder course shall be composed of broken stone, equal in quality to the stone specified for concrete base, its largest dimension passing an inch-and-a-quarter screen, and the stone, after passing the heating drums, shall not contain less than 5 nor more than 15 per cent of material passing a No. 10 screen.

The stone will be heated not higher than 350° F., in suitable appliances. It is then to be thoroughly mixed by machinery with asphalt cement, such as is acceptable for surface cement, penetration 50 to 80, at such temperature and in such proportions that the resulting binder will have life and gloss without an excess of cement. Should it appear dull from overheating or lack of cement, it will be rejected. While hot it will be hauled upon the work, spread upon the base so that when compacted it will be at least 1½ inches in thickness, and immediately rammed and rolled until it is cold. Should the resulting course not show a proper bond, it must be immediately removed and replaced by and at the expense of the contractor. Binder and top shall not be taken from the yard to the site of the work, when in the judgment of the engineer, weather conditions are unsuitable for the work of laying the pavement.

The contractor shall not enter upon a concrete base in order to lay the binder course until it has obtained sufficient strength for such a purpose, and during the period between laying the base and binder he shall properly protect it, and, when ordered by the engineer, shall sprinkle it in warm weather between the hours of sunrise and sunset as often as may be necessary, and in cold weather cover it with a material suitable for its protection.

9. *Asphalt wearing surface.*—The wearing surface of the pavement shall be composed of asphalt cement (refined asphalt and asphaltic flux), clean, sharp-grained sand, fine absorbent mineral dust.

(*a*). *Asphalt.*—The asphalt shall be refined until homogeneous and free from water and shall not at any time be heated to a temperature high enough to injure it, and 100 parts of the refined product shall require not more than 30 parts of flux to produce the asphalt cement described in paragraph 9–c.

The asphalt for class (*a*) work shall conform to such tests as will establish its identity as a product of the refinement of a natural crude asphalt without the admixture of any other material.

The refined asphalt for class (*b*) work shall be the product of refinement of an unadulterated natural asphaltic oil, and shall contain, after refinement, not less than 90 per cent of bitumen soluble in carbon bisulphide.

(*b*). *Asphaltic flux.*—The flux used in the manufacture of asphalt cement shall be an asphalt oil from which the lighter oils have been removed by distillation without cracking, until the flux has the following characteristics:

Free from water and foreign matter.

Flash point, not less than 300° F.

Distillate at 400° for 18 hours, less than 10 per cent.

The flash point shall be taken in New York State closed oil tester.

The distillate shall be made with about 50 grams of flux in a small glass retort, provided with a thermometer and placed in a copper holder. The residue in the retort, after distilling, must be free from coke.

Any other softening agents approved by the engineer commissioner may be used in place of asphaltic flux.

(*c*) *Asphalt cement.*—The asphalt cement must be of refined asphalt, fluxed when necessary with asphaltic oil, refined maltha, or other approved flux. The cement must be practically free from water and must be within the range of 40 to 70 penetration when tested at 77° F. on Dow penetration machine with No. 2 needle, 100 grams, 5 seconds. The degree of penetration to be fixed by the engineer commissioner.

Preference will be given to an asphalt cement that is not readily affected by water, provided it is satisfactory in other respects. The use of an asphalt under these specifications shall be subject to the approval of the engineer commissioner, and if an asphalt has been proposed for use by the contractor and approved by the engineer commissioner, no change in the asphalt to be used shall be made unless with the approval of the engineer commission. If an asphalt or flux is submitted for use which has not been successfully used for a period of at least two years for paving under conditions similar to those existing in the District of Columbia, its use may be limited to such extent as may be deemed advisable, or it may be rejected for use entirely in the discretion of the engineer commissioner.

The asphalt cement must comply with the following tests:

1. It must be of such consistency that when tested at 32° F. it will not show a hardness below 10 penetration, and when tested at 115° F. it will not be softer than 350 penetration.

2. When a briquet of the cement having a minimum cross section of one square centimeter, having a penetration of 50°—53° at 77° F. is tested for ductility at 77° F., the bitumen must stretch at the rate of 5 centimeters per minute to a distance of 25 centimeters before breaking.

3. When the cement is heated in an open tin box ¾ inch deep by 2½ inches in diameter at a temperature of 300° F. for seven hours in a hot-air oven it must not show a loss by volatilization of over 5 per cent and must not have been hardened over 30 per cent by this heating.

The asphalt cement must never be heated to a temperature that will injure it.

When the asphalt cement contains over 5 per cent of material that will separate by subsidence while in molten condition it must be thoroughly agitated before drawing from storage and while in use in the supply kettles so as to insure a uniform cement.

These properties shall be determined by tests made by uniform methods, as adopted in the office of the engineer commissioner.

(*d*) *Sand.*—The sand to be used shall be free from mud, hard grained, and moderately sharp. On sifting it should have at least 15 per cent of material that would be caught on a 40 mesh per inch screen, 25 per cent of material that will pass an 80 mesh to an inch screen, and 10 per cent, at least, must pass a 100 mesh to an inch screen. If the sand to be used does not contain the desired fine material, mineral dust may be added to make up the deficiency, and in any case at least 5 per cent of such mineral dust shall be used. The amount of fine material may be increased at the discretion of the engineer commissioner.

(*e*) *Mineral dust.*—This shall be any fine Portland cement or limestone dust, the whole of which shall pass a 30-mesh screen, and at least 85 per cent pass a 100-mesh screen.

(*f*) *Asphalt paving material.*—The materials complying with the above specifications shall be mixed in proportion by weight, depending upon their character and the traffic on the street, and upon the character of the asphalt, and will be determined by the engineer commissioner, but the percentage of bitumen in any mixture soluble in carbon bisulphide shall not be less than 9 nor more than 13 per cent. If the proportions of the mixture are varied in any manner from those specified, the mixture will be condemned; its use will not be permitted; and, if already placed on the streets, it must be removed and replaced by proper materials at the expense of the contractor.

The sand or the mixture of sand and stone dust, and the asphalt cement, will be heated separately to about 300° F. The dust, if limestone, will be mixed while cold with the hot sand in the required proportions, and then mixed with the asphalt cement at the required temperature, and in the proper proportion

in a suitable apparatus, so as to affect a thoroughly homogenous mixture. Sand boxes and asphalt gauges will be weighed in the presence of inspectors as often as may be desired.

Samples of all material entering into the composition of the pavement shall be supplied to the inspector of asphalt and cements when required, in suitable tin boxes and cans; he shall have access to all branches of the works at any time, and shall have the right to obtain samples of all materials from the source of supply.

(*g*) *Laying asphalt surface.*—The asphalt paving mixture, prepared in the manner described, will be hauled to the site of the work at a temperature of not less than 250° or more than 350° F. in trucks or wagons, canvas covers being provided for use in transit. It will then be shoveled into place and thoroughly spread to a thickness of at least 2½ inches by means of hot-iron rakes, in such manner as to give uniform and regular grade, so that, after having received its ultimate compression, it will have a net thickness of at least 1½ inches. This depth will be constantly tested by means of gauges furnished by the engineer commissioner. The surface will then be compressed by steam rollers. First with a roller weighing not less than 2½ tons, after which a small amount of hydraulic cement will be swept over it and will then be thoroughly compressed by a steam roller weighing not less than 10 tons, the rolling being continued for not less than five hours for every 1,000 yards of surface. The street to be barricaded, the barricades to remain for such length of time as deemed necessary by the engineer commissioner. Binder or topping shall not be laid when, in the judgment of the engineer, weather conditions are unsuitable for the work of laying the pavement. The surfaces on which they are laid must be cleaned to the satisfaction of the engineer so that good adhesion of the binder to the base and of top mixture to the binder may be secured.

10. *Laying vitrified blocks.*—Vitrified-block gutters will ordinarily be 13½ inches wide, laid on a concrete base 6 inches in depth, of the same material and proportions and laid in the same manner as prescribed in these specifications for the concrete base under asphalt pavements.

As soon as practicable after the base concrete has been laid, a dry mixtrue, composed of four parts of the sand specified in paragraph 6 (*b*), and one part of Portland cement, thoroughly mixed, will be spread thereon to the depth of not less than one-half inch, as a bed for the paving blocks, and regulated so as to be exactly parallel to the finished grade of the gutter.

On the bed thus prepared for them the blocks will be set on edge, with the longest dimensions at right angles to the curb, or as directed by the engineer.

The longitudinal joints of each course of blocks laid must be broken by a lap of not less than 4 inches.

The blocks will then be carefully rammed by placing a plank over several courses and ramming the plank with a heavy rammer. The ramming will be continued until the blocks reach a firm, unyielding bed and present a uniform surface, with proper grade. Any lack of uniformity in the surface or defect in the grade must be corrected by taking up and relaying the blocks.

After proper ramming the entire gutter will be thoroughly grouted with a thin, easily flowing grout, of neat Portland cement.

A similar construction of block to that described for gutters may be used adjacent to railroad tracks; the base will in that case extend to the bottom of the crossties, or at least 6 inches thick.

The blocks will be furnished the contractor at the District property yards, and must be hauled to the work at his expense.

11. *Additional work.*—The following specifications will cover incidental work which may be required of the contractor:

(*a*) *Setting 6-inch by 20-inch granite and bluestone curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 24 inches below the top of the curb when set, and 20 inches wide, will be excavated to receive the curb and its gravel bed; the dimensions of the trench, in width, will be 14 inches from the curb line toward the building line of the street, and 6 inches from said curb line toward the center line of the street. In the trench thus prepared the curb will be set, and brought to line and grade, with plumb face. Spalls of stone, hard-burned brick or other acceptable substance prepared for the purpose, will be used to adjust the curb to grade, and these spalls will be so placed and adjusted as to support the curbing permanently, and afford a firm and stable support for it, without the use of small chips and fragments, used as "shimming" pieces, to wedge the stone in place.

After the curb has been properly placed and adjusted to line and grade, the trench will be filled with gravel of approved quality, to within 8 inches of the top of the curb, the filling to be done in layers of not more than 3 inches in depth, and thoroughly compacted by a suitable ramming. Close contact joints and even surfaces must be made, and the lines and grades furnished strictly followed.

(*b*) *Setting 8-inch by 8-inch granite curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 15 inches below the top of the curb when set, and 18 inches wide, will be excavated to receive the concrete and the curb. The dimensions of the trench in width will be 14 inches from the curb line toward the building and 4 inches from the curb line toward the center line of the street. In this trench thus prepared a bed of concrete, composed of 1 part Portland cement, 4 parts of clean concrete sand, and 10 parts of screen pebbles, will be laid, filling the trench to a depth of 5 inches, the material to be mixed and laid under the same conditions as prescribed for laying cement concrete base for sheet asphalt pavements. On the base prepared and laid as above, the curb will be placed before the concrete has set, and adjusted to line and grade by setting it to a firm, unyielding bearing in a bed of freshly made concrete, by the use of heavy wooden mauls. The face of the curb must be plumb and true to line, and the top of it carefully set to grade with close and even contact joints. After the curb has been set to line and grade, the trench on the footwalk side will be immediately filled with concrete to within 5 inches of the top of the curb, which will be thoroughly rammed and compacted, after which it will immediately be covered with earth to prevent injury to it through too rapid evaporation, etc. In case vitrified-block gutters are to be laid in front of the curb, any portion of the concrete base of the curb that would interfere with the laying of such gutters must be removed immediately after the curb is set.

(*c*) *Resetting 6-inch by 20-inch granite and bluestone curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except no hauling of curb is required other than that incidental to the necessary disposition of it upon the line of the work. Under this classification also, the curb may be adjusted to line and grade without removing it from its trench, if so ordered by the engineer.

(*d*) *Resetting 8-inch by 8-inch granite curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except that no hauling of the curb is required other than that incidental to the necessary disposition of it upon the line of work, and no new concrete is required other than that sufficient to imbed the stone and back and adjust it to line and grade.

(*e*) *General instructions.*—All curb will be furnished to the contractor at the District property yard, and will be hauled by him to the site of the work; any curbing unaccounted for, or improperly disposed of, or damaged or broken, through careless or unskilled handling, will be charged against him, the value of the loss to the District will be deducted from any amount due the contractor for work done, as determined by the engineer.

All expenses connected with or incidental to the work of setting or resetting curb, as described above, including the hauling of the curbing, preparing the curb trenches, and the necessary grading connected therewith, furnishing gravel and spalls, furnishing and placing concrete, and all other material and labor necessary to execute the work in accordance with the specifications therefor, are included in the fixed price for the respective items as hereinafter stated. The cost of dressing, jointing, or cutting the curb will be paid for additionally, but no other claim for additional compensation will be entertained. Should the adjoining brick footwalks be disturbed in order to set or reset the curb the portion so disturbed shall be repaved, if required by the engineer, without cost to the District.

12. *Prices for additional work.*—Contractors must do such additional work incident to the construction of new pavements as may be ordered on each street by the Engineer Commissioner. All such work shall be in accordance with current District specifications. Prices paid for this work will be as stated below:

1. Removing old curb, including haul, not to exceed 2 miles, 15 cents per linear foot.
2. Hauling same beyond distance of 2 miles, 1½ cents per linear foot per mile.

3. Hauling from District property yard and setting 6-inch by 20-inch curb, 44 cents per linear foot.
4. Resetting 6-inch by 20-inch granite and bluestone curb, 40 cents per linear foot.
5. Hauling from District property yard and setting 8-inch by 8-inch curb, 58 cents per linear foot.
6. Resetting 8-inch by 8-inch curb on new concrete base, 50 cents per linear foot.
7. Resetting 8-inch by 8-inch curb on old concrete base, 30 cents per linear foot.
8. Dressing, jointing, and cutting curb, etc. (stonecutter's time), including setting-up labor, $1 per hour.
9. Removing old rubble, cobble, flagging stone, and brick, vitrified block, or brick, etc., including haul not to exceed 2 miles, 30 cents per square yard.
10. Removing old asphalt blocks, including haul not to exceed 2 miles, 32 cents per square yard.
11. Removing old granite block, including haul not to exceed 2 miles, and removal of old paving bed and cleaning concrete base where same exists, 45 cents per square yard.
12. Overhaul on items 9, 10, and 11, 2½ cents per square yard per quarter mile or fraction thereof.
13. Removing old coal-tar or asphalt surface and binder from concrete base in connection with resurfacing work, including haul not to exceed 2 miles, 20 cents per square yard.
14. Grading and hauling earth, not to exceed 1,000 feet, $1 per cubic yard.
15. Grading and hauling macadam not to exceed 1,000 feet, $1 per cubic yard.
16. Removing old coal-tar and bituminous pavements or base of the class laid since 1880, and hauling not to exceed 1,000 feet, $1.70 per cubic yard.
17. Removing old coal-tar and bituminous pavement or base of the class laid prior to 1880 and hauling same not to exceed 1,000 feet, $3.20 per cubic yard.
18. Removing old concrete base and hauling not to exceed 1,000 feet, $2.60 per cubic yard.
19. Hauling excavated material per 100 feet over first 1,000 feet, 1½ cents per cubic yard.
20. Laying or relaying vitrified brick or block on old concrete base, $2 per square yard.
21. Laying or relaying asphalt block and vitrified brick or block on gravel base, 6 cents per square yard.
22. Cleaning old vitrified brick or block for relaying, 45 cents per square yard.
23. Laying and relaying granite block, $1.10 per square yard.
24. Relaying cobble and rubble, 45 cents per square yard.
25. Repairing cement walks, including haul, $2.50 per square yard.
26. Repairing brick walks, 40 cents per square yard.
27. Laying Portland cement concrete base in place, $8 per cubic yard.
28. Adjusting man hole tops and basin covers to grade, $2 each.
29. Adjusting water-valve casings to grade, $4 each.
30. Asphaltic top, 75 cents per cubic foot.
31. Asphaltic top, 43 cents per cubic foot.
32. Adjusting electric-light or telephone manhole tops to grade, as follows:
    (*a*) Size, less than 6 square feet area, $2 each.
    (*b*) Size, over 6 and less than 16 square feet, $4.50 each.
    (*c*) Size, from 16 to 28 square feet, $7.50 each.

13. *Extra work.*—The contractor must be prepared to do any extra work hat may be ordered in writing by the engineer, and for this he will be paid t current rates for work of a similar character, or, if the extra work should e of a class for which no rate is fixed by current contracts, the actual rea-onable cost to the contractor, as determined by the engineer, plus 15 per cent f said cost.

The contractor shall have no claim for compensation for extra work unless ame is ordered in writing by the engineer. All additional and extra work hall conform to current District of Columbia specifications therefor.

14. *Guaranty.*—All work under this contract will be guaranteed and kept in repair by the contractor without cost of the District of Columbia for a period of one year from date of its completion as indicated on the final voucher for each street.

It is further expressly understood and agreed that if any of the pavements laid should, for any reason whatsoever, within the period of one year, prove inferior to the best laid in the District prior to July 1, 1917, then the contractor shall, on demand of the commissioners, remove such defective pavements and relay them with new material of approved quality. The engineer commissioner shall decide the question of inferiority.

On expiration of guaranty for maintenance the work is to be inspected, and all imperfections must be corrected where and to such extent as the engineer shall direct, upon which the engineer will accept the same in writing, and until such acceptance the guarantee shall be in force. Repairs that may become necessary during the guarantee period will be made by the contractor when ordered by the engineer commissioner.

If the contractor fails to make necessary repairs after notice to do so, the commissioners may cause such work to be done and the contractor and the surety under the bond shall be jointly and severally liable for the cost of same.

15. *Cuts.*—Contractors shall be responsible for any work done upon any street over plumbers' cuts or other work done by the permission of the commissioners before the work is begun.

16. *Modification.*—The commissioners reserve the right to modify these specifications as may from time to time seem desirable. The amount of compensation, if any, due the contractor for said modifications will be determined by the engineer commissioner on the same basis as in the case of extra work.

17. *Constructing cement curb, gutters, and cement roadways.*—All work of constructing cement curb, gutters, and cement roadways, will be done in accordance with the following specifications, and shall conform to the drawing of same on file in the office of the engineer of highways.

18. *Cement.*—The District will furnish to the contractor all Portland cement necessary for this work, from the stock on hand at its warehouse at Fourteenth and D Streets SW., and will charge said contractor with the cost of same at the rate of $2.75 per barrel of cement for each and every barrel so furnished; and will collect the amount due therefor from any moneys found to be due to said contractor by the District. Where said cement is furnished in bags, the bags shall be returned to the District warehouse by the contractor to whom the cement is furnished; and upon failure to return said bags in good condition an additional charge shall be made against the contractor at the rate of 25 cents for each bag not so returned. Four bags containing 3.8 cubic feet of cement weighing 100 pounds per cubic foot shall constitute a barrel of cement under these specifications.

19. *Sand.*—The sand used shall be equal to what is known locally as best well graded Potomac River concrete sand. It shall be clean and free from injurious soft particles or organic matter.

20. *Gravel.*—The gravel shall be equal to what is known locally as best well graded Potomac River 1½-inch washed gravel. It shall be clean and free from objectionable matter.

21. *Sand screens.*—Sand used for surface layer must be screened on the line of work; screens to be used for this purpose to be designated by the engineer.

22. *Measurement of aggregates.*—Sand and gravel for concrete or mortar shall be carefully measured. The quantities for each batch shall be exactly sufficient to be used with either one, two, or three sacks of cement, and not fractional sacks.

23. *Storing aggregates.*—Sand and gravel shall be kept clean. Delivery on the subgrade will not be permitted prior to rolling as stipulated in paragraph 75. When aggregates are deposited directly on the subgrade, care shall be taken when shoveling the aggregates for use, that no clay or earth is taken.

24. *Water.*—The amount of water used in mixing shall be the minimum quantity which will produce a workable concrete suitable for the purpose specified. Water used shall be clean and free from oil, acid, alkali or vegetable matter.

25. *Mortar.*—Mortar shall be composed of cement and sand in proportions specified. The mixtures are intended to secure a mortar in which every particle of sand is enveloped by cement, and this result must be obtained to the

satisfaction of the engineer. If the mixing be by hand, it shall be done on a water-tight platform with tight raised edges. Mixing may be done by the use of an approved machine. No batch shall contain more than one barrel of cement.

26. *Concrete mixed by hand.*—If the mixing be by hand, it shall be done on a water-tight platform with tight raised edges. The aggregate shall be spread over the mortar made as above directed. The aggregate shall be thoroughly drenched with water just before it is added to the mortar. The drenching shall not be done in the barrow, nor otherwise to permit the addition of free water to the mortar. Each batch of concrete shall be thoroughly mixed until each piece of aggregate is wholly coated with mortar and in a manner satisfactory to the engineer.

27. *Concrete mixed by machine.*—A batch mixer of approved type shall be used and it shall be equipped with a device for measuring water and another one for mechanically preventing emptying of the mix, until all the materials have been mixed a minimum time of one minute. During this period the drum shall make not less than 12 nor more than 18 revolutions per minute. The entire contents shall be removed from the drum before materials are placed therein for the succeeding batch.

28. *Retempering.*—Retempering of mortar or concrete which has partially hardened, that is, the mixing of this mortar or concrete with additional materials or water, shall be prohibited.

29. *Concrete for cement curb.*—Concrete for curb shall be composed of 1 part cement, 2 parts sand, and 4 parts of gravel. Should the contractor so desire, he will be permitted to substitute broken stone for the gravel used in this concrete. Such stone must be hard, durable, and properly broken to a size small enough to pass through a ring 2 inches in diameter; and the size, quality, and grading must be approved by the engineer. It shall be free from foreign substances as provided for gravel.

30. *Subgrade for curb.*—The space over which the cement curb is laid is to be excavated and trimmed to a depth of at least 14 inches below the finished grade and for the full width of the curb. In the trench thus prepared a bed of bank gravel or coarse hard cinders will be spread to a depth of 6 inches and thoroughly rammed. The gravel must be free from an excess of clay or loam and must be approved by the engineer.

31. *Curb.*—The curb shall be cut in lengths of about 10 feet. The top shall be finished with 1 inch of cement mortar, composed of 1 part cement to 2 parts sand. Forms must be put up for this curb and removed when the concrete has sufficiently set; and the face and top surface of the curb troweled or rubbed to a neat finish. Cement curb shall be constructed as shown in drawings on file in the office of the engineer of highways. The space at back of curb is to be filled with earth up to the level of the curb for not less than 1 foot in width.

32. *Mortar and surface for sidewalk repair.*—Mortar for the surface layer of sidewalks shall be made of the specified cement and sand, mixed in the manner specified above in the proportion of 2 to 3, by volume. The mortar shall be spread while fresh upon the concrete base while the latter is still soft and adhesive and before it shall have reached its first set, in such quantity that after thorough manipulation it shall be 1 inch in thickness. It is then to be leveled off and beaten with wooden battens, so as to break any air cells and make the surfacing perfectly solid and at the true grade. No work marked by sand which has been spread over it for protection will be accepted.

33. *Dry coat for sidewalk repair.*—A coating of dry cement and fine sand in equal proportions, by volume, and such part and kind of coloring matter as the engineer may direct thoroughly mixed, is then to be floated into the layer; and by skillful use of tools the surface is to be made smooth. The joints of the blocks will then be made to a depth of one-half inch immediately over the joints in the concrete base and the blocks brought to a true line and grade and finished with trowels to the satisfaction of the engineer. Any lack of adhesion between the concrete and mortar layers shall be sufficient reason for requiring entire removal and substitution of new and satisfactory work.

34. *Grading for roadways.*—The area over which a pavement is to be laid must be graded to the proper depth below the surface of the pavement when completed, any objectionable or unsuitable matter below the bed being removed to such depth as may be directed by the engineer and the space filled with

suitable material thoroughly compacted. The bed, after being trimmed so as to be parallel to the surface of the pavement when completed, will be thoroughly compacted by rolling, with a roller weighing not less than 5 tons and by heavy ramming at places which can not be reached by the roller; dampening the bed before rolling and ramming, if required, to the satisfaction of the engineer. No extra allowance will be made for trimming or rolling, but the volume of earth, etc., removed will be paid for as grading. The rolling of the subgrade for both macadam and concrete roadways is to be done by the roadway contractor in connection with the grading, and no additional compensation for this rolling will be allowed.

35. *Maintenance of subgrade.*—If hauling over the subgrade after rolling results in cuts or other objectionable irregularities, the contractor shall reroll the subgrade before surfacing. Tamping in such cases instead of rerolling is to be prohibited. Immediately before placing roadway paving the subgrade shall be tested for elevation and corrected if above grade as much as one-eighth inch.

CEMENT CONCRETE ROADWAY.

36. *Composition.*—Cement concrete roadway shall be composed of 1 part of the specified cement, 2 parts sand and 3 parts gravel, laid upon the prepared subgrade to a thickness of 6 inches. Broken stone, as specified herein in paragraph 70, for cement curb and gutter, may be substituted for part of or all of the gravel at the option of the contractor.

37. *Laying concrete.*—The concrete shall be deposited on the moist subgrade in successive batches, continuously between transverse joints for the full width of the road.

38. *Transverse joints.*—Contraction or expansion joints except as provided for in paragraph 80 will not be required.

39. *Joints at the close of day's work.*—At the close of each day's work and also when the process of depositing concrete is stopped for a length of time such that in the opinion of the engineer the concrete has taken its initial set, a butt construction joint shall be made perpendicular to the center line of the pavement. For this joint there shall be used a clean plank having a thickness of not less than 2 inches. Upon the resumption of work the plank shall be carefully removed and the fresh concrete deposited against the old in such manner as to avoid injury to the edge of the old concrete.

40. *Finishing concrete.*—The surface of the concrete shall be struck off by means of templates, moved with a crosswise motion. The concrete having been brought to surface grade, men will not be permitted to stand on boards, placed thereon, in order to carry on the work.

41. *Rolling.*—Immediately after the concrete has been struck off, it shall be rolled with an approved metal hand roller, having a smooth even surface approximately 6 feet in length, not less than 8 inches or more than 12 inches in diameter. An 8-inch roller shall weigh not more than 12 pounds per lineal foot and a 12-inch roller not more than 15 pounds per lineal foot. The roller shall be moved very slowly over the surface of the concrete with a crosswise motion so as to advance the roller longitudinally not to exceed 2 feet in passing from one side of the pavement to the other. The rolling shall be continued until free water ceases to come to the surface, but all portions of the concrete surface shall receive at least three rollings.

42. *Belting.*—After the rolling has been completed the concrete shall be finished by using a belt made of canvas or rubber belting not less than 12 inches in width nor less than 2 feet longer than the width of the pavement. When required or approved by the engineer other methods of surface finishing shall be used.

43. *Protection of concrete.*—On the next day after the pavement has been laid the surface shall be covered with 2 inches of earth which shall be kept wet for a period of not less than 18 days under the most favorable conditions, the period to be stipulated by the engineer, during which time traffic shall be excluded from the pavement by the erection and maintenance of suitable barricades. After the foregoing period has elapsed, the covering on the concrete shall be removed, the surface of the pavement swept clean, after which the roadway may be opened to traffic. When required or approved, other methods of curing or protecting the concrete may be used.

. *Freezing weather.*—Concrete shall not be mixed or placed when the temture is below 35° F. In freezing weather the surface must be protected frost at least 10 days from the time of laying. If the pavement becomes eciably damaged by frost, it shall be replaced at the contractor's expense written notice of the engineer.

. *General protection of work.*—All cement work is to be kept moist, proed against the weather and guarded against travel until it has set. Care l be taken at all times not to interfere with business or travel more than is lutely necessary for faithful execution of the work. The contractor will be allowed to occupy the streets by material more than is absolutely neces- for the prosecution of the work. The contractor will be held responsible all injury done to the work in any way until it has been accepted and meas- d by the engineer.

6. *Plumbing.*—All preliminary plumbing work will be done by the District. contractor will be held responsible for any damage or obstruction to plumb- appurtenances due to his work.

7. *Cleaning work.*—Before acceptance of the work it will be cleaned and all bris and unused material removed. No crumbling or uneven edges of the ment work will be allowed to remain.

48. *Additional work.*—Contractors must do such additional work incient to the construction of new pavements as may be ordered on each street by e engineer commissioner. Such work shall be in accordance with current District specifications. Prices paid for this work will be as stated below:

(*a*) Removing old curb, including haul not to exceed 2 miles, 15 cents per linear foot.

(*b*) Hauling same beyond distance to nearest property yard, 1½ cents per linear foot per mile.

(*c*) Removing old rubble, cobble, granite block, flagging stone, brick, asphalt block, vitrified block, etc., including haul of not over one-fourth mile, 15 cents per square yard.

(*d*) Hauling same to or from place of deposit when more than one-fourth ile from the work, for rubble, cobble, flagging, and brick, 2½ cents per square yard for each additional one-fourth mile or fraction thereof.

(*e*) Removing old concrete base and hauling not over 1,000 feet, $2.60 per cubic yard.

(*f*) Hauling excavated material per 100 feet over an average distance of 1,000 feet, 1½ cents per cubic yard.

(*g*) Resetting 6-inch by 20-inch curb, 40 cents per linear foot.

(*h*) Resetting 8-inch by 8-inch curb on old base, 25 cents per linear foot.

(*i*) Resetting 8-inch by 8-inch curb on new concrete base, 50 cents per linear foot.

(*j*) Adjusting manhole tops and basin covers to grade, $2 each.

(*k*) Adjusting water valve casings to grade, $4 each.

(*l*) Dressing, jointing, and cutting curb, etc. (stonecutter's time), including setting-up labor, $1 per hour.

(*m*) Relaying brick walks, 40 cents per square yard.

(*n*) Saving stone, bowlders, or cobble, etc., of acceptable quality, 80 cents per cubic yard.

(*o*) Portland cement concrete base (proportions 1:3:6), $8 per cubic yard.

(*p*) Relaying cement walks, $2.50 per square yard.

(*q*) Cleaning vitrified block and granite block for relaying, 45 cents per square yard.

9. *Extra work.*—The contractor must be prepared to do any extra work t may be ordered in writing by the engineer arising out of any modifica- of these specifications that may appear necessary, and for this he will be d at current contract rates for work of similar character; or, if the extra k should be of a class for which no rate is fixed by current contracts, the nal reasonable cost to the contractor as determined by the engineer, plus 15 cent. The contractor shall have no claim for compensation for extra work ess the same is ordered in writing by the engineer. All additional and extra k shall conform to current District of Columbia specifications therefor.

0. *Bids.*—The contractor will, for the prices bid, do all the work prescribed hese specifications; provide bridges, fences, and other means of maintaining

when needed for use of of laborers on line of work, necessary toilet conveniences secluded from public observation.

13. *Cleaning up.*—On the completion of work it shall be thoroughly cleaned up before it will be accepted.

14. *Lines.*—All necessary lines and levels will be given by the engineer by means of suitable marks, and in establishing them the contractor shall provide such materials and assistance as may be required by the engineer. All marks given are to be carefully preserved and if destroyed through carelessness the cost of replacing them shall be charged against the contractor at a fixed price of $2 for each point, to be deducted from any money found due at final settlement.

15. *Interpretation.*—Any doubt as to the meaning of these specifications will be explained by the engineer, who shall have the right to correct any errors or omissions in them when such correction is necessary for the proper fulfillment of their intention. Whenever the word "commissioners" is used in these specifications, it is understood to designate the Commissioners of the District of Columbia. Whenever the word "engineer" is used, it is understood to designate the Engineer Commissioner of the District of Columbia, or, in his absence, his duly authorized assistants, assistant engineers, and inspectors representing him, limited by the special duties intrusted to them.

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If the work is allowed during cold or freezing weather, the contractor shall take such additional precautions as the engineer shall require, without additional expense, and under no circumstances shall materials be used which have been injured by the weather.

7. *Inspection.*—Inspectors may be appointed who shall have access to all parts of the work at all times and whose duty it shall be to point out to the contractor any neglect or disregard of the specifications of the contract; but the right of final rejection of the work will not be waived at any time. Upon all technical questions concerning the execution of the work, in accordance with the specifications and the measurements thereof, the decision of the engineer shall be final. Ordinarily, one inspector will be employed by the District of Columbia for each section of the work under contract; but if, on account of any apparent disregard of the specifications, additional inspectors shall be required, they will be employed by the District of Columbia, at the rate of not to exceed $4.50 per diem each, and the cost of the same will be charged to the contractor and deducted from any moneys due or that may become due to the contractor.

8. *Condemned work.*—All materials furnished and work done not in accordance with these specifications shall be removed within 24 hours after written notice from the engineer, by and at the expense of the contractor; or, in case of failure to do so, it shall be removed by the District of Columbia and the cost thereof charged to the contractor and deducted from the amount due or which may become due him. None but the best material of the several descriptions shall be used.

9. *District material.*—No materials furnished by the District shall be applied to any other use, public or private, than that for which they are issued to the contractor. The contractor will be held responsible for all materials delivered to him upon requisition, and shall be charged for all materials delivered upon said requisition. Should the amount of materials actually delivered and not properly accounted for exceed the amount used upon the work, the cost to the District of the difference must be made good by the contractor, and will be deducted from any moneys which may be due him.

Any material that is the property of the District that is not accounted for by the contractor to the satisfaction of the engineer will be charged against the contractor at the contract price for similar material.

10. *Failure.*—If the contractor shall delay or fail to commence with the delivery of the material or the performance of the work as specified herein, or shall, in the judgment of the Commissioners of the District of Columbia, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the said commissioners shall have the power to annul this contract by giving notice in writing to that effect to the contractor, and upon the giving of such notice all payments to the contractor under this contract shall cease, and all money or reserved percentage due or to become due thereunder shall be retained by the said commissioners until the final completion and acceptance of the work herein stipulated to be done; and the said commissioners shall have the right to recover from the contractor whatever sums may be expended by the District of Columbia in completing the said contract in excess of the price herein stipulated to be paid the contractor for completing the same, and also all costs of inspection and superintendence, including all necessary traveling expenses connected therewith, incurred by the said District of Columbia, in excess of those payable by the said District of Columbia during the period herein allowed for the completion of the contract by the contractor; and the said commissioners may deduct all the above-mentioned sums out of or from the money or reserved percentage retained as aforesaid; and upon the giving of the said notice the said commissioners shall be authorized to proceed to secure the performance of the work or delivery of the materials, by contract or otherwise, in accordance with law.

11. *Payments.*—Payments will be made monthly, provided the progress of the work is satisfactory, less 10 per cent of each estimate, to be withheld until final payment.

12. *Conveniences.*—The contractor shall provide, for use of the District inspectors, stationed at paving plant, and cement warehouse, suitable office and testing room with such plain furniture as may be necessary for the proper transaction of their business as agents for the District. They shall also furnish,

when needed for use of of laborers on line of work, necessary toilet conveniences secluded from public observation.

13. *Cleaning up.*—On the completion of work it shall be thoroughly cleaned up before it will be accepted.

14. *Lines.*—All necessary lines and levels will be given by the engineer by means of suitable marks, and in establishing them the contractor shall provide such materials and assistance as may be required by the engineer. All marks given are to be carefully preserved and if destroyed through carelessness the cost of replacing them shall be charged against the contractor at a fixed price of $2 for each point, to be deducted from any money found due at final settlement.

15. *Interpretation.*—Any doubt as to the meaning of these specifications will be explained by the engineer, who shall have the right to correct any errors or omissions in them when such correction is necessary for the proper fulfillment of their intention. Whenever the word "commissioners" is used in these specifications, it is understood to designate the Commissioners of the District of Columbia. Whenever the word "engineer" is used, it is understood to designate the Engineer Commissioner of the District of Columbia, or, in his absence, his duly authorized assistants, assistant engineers, and inspectors representing him, limited by the special duties intrusted to them.

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Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1920

UNDER THE DIRECTION OF

COLONEL CHARLES W. KUTZ
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

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ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT OF COLUMBIA.

Colonel CHARLES W. KUTZ, *Corps of Engineers, United States Army, Engineer Commissioner.*
Major F. S. BESSON, *Corps of Engineers, United States Army, Assistant.*
Major CAREY H. BROWN, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONER.

RECORD DIVISION:
ROLAND M. BRENNAN, *Chief Clerk.*
WHARF COMMITTEE:
ROLAND M. BRENNAN, *Chief Clerk, Engineer Department.*
D. E. MCCOMB, *Engineer of Bridges.*
RUSSELL DEAN, *Harbor Master.*
DISTRICT BUILDING:
Major F. S. BESSON, *Superintendent.*

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HIGHWAYS (STREETS, ROADS, BRIDGES, ETC.):
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J. W. DARE, *Assistant Engineer of Highways.*
Sidewalks and alleys—
H. N. MOSS, *Superintendent of Streets.*
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EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1920.

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, October 1, 1920.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats., 108), a report of the official doings of that government for the fiscal year ended June 30, 1920.

* * * * * * *

ROADWAY PAVEMENTS.

The accompanying table shows the area, in square yards, of new roadway pavements laid and old roadway pavements resurfaced during the year, with the totals in square yards and miles of the various kinds of pavements at the close of the fiscal year.

Comparative statement showing character and extent of roadway pavements.

	Existing amount on June 30, 1919.		New pavement laid during the year, square yards.	Replaced with asphalt.	Existing amount on June 30, 1920.	
	Square yards.	Miles.			Square yards.	Miles.
Sheet asphalt and coal tar	3,204,361	170.10	49,227	.....	3,253,588	172.82
Asphalt block	630,636	32.05	.....	586	630,050	32.02
Durax block	12,294	.30	.....	.....	12,294	.30
Asphaltic or bituminous concrete:						
On concrete base	78,708	4.58	.....	.....	78,708	4.58
On broken-stone base	51,088	2.68	.....	.....	51,088	2.68
Cement concrete	168,239	8.99	53,884	.....	222,123	11.82
Granite block and rubble	391,931	21.44	.....	5,267	386,664	21.13
Vitrified block	17,390	1.04	.....	.....	17,390	1.04
Cobble	62,135	3.00	.....	7,489	54,646	2.73
Macadam (estimated)	1,931,124	124.05	43,148	[1] 19,716	1,954,556	125.29
Gravel and unimproved (traveled)	.....	151.28	.....	.....	.....	147.72
Gutters on asphalt streets	229,036	.....	3,201	.....	232,237	.....
Gutters on asphaltic concrete streets	11,201	.....	.....	.....	11,201	.....
Pavements maintained by street railways	564,525	.....	.....	.....	564,525	.....
Total	7,352,668	519.51	149,460	33,058	7,469,070	522.13

[1] Includes 7,584 square yards of concrete pavement.

NOTE.—35,375.07 square yards sheet asphalt and coal tar pavements replaced, including 22,882.35 yards asphalt surface on old base.

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[1] Includes 7,584 square yards of concrete pavement.

NOTE.—35,375.07 square yards sheet asphalt and coal tar pavements replaced, including 22,882.35 yards asphalt surface on old base.

The sums appropriated for expenditures during the year under this head were as follows:

For paving new roadways and repairing old roadway pavements	$727,500
For construction and repair of suburban roads	426,800
For grading streets, alleys, and roads	30,000

The dominating characteristics of the year's work was scarcity of materials, especially such as were subject to railroad transportation, and, specifically, as to the latter, cement and broken stone. Labor shortage was not controlling, being subordinated as a deterrent to progress by the shortage of material. High costs continued and were accentuated, but the morale of the working force was improved. Such delays as occurred in the completion of the year's program within the year, and there were some, were really due to delay in receipt of material, and in this respect the failure of the District to furnish material to be supplied by it was, if anything, more pronounced than the like failure of our contractors to secure their own.

The prices paid under contracts for roadway pavements during the year were as follows:

	Per square yard.
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 6-inch concrete base	$2.96
Laying vitrified block with 6-inch concrete base	3.25
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 5-inch concrete base	2.82
Laying vitrified block with 5-inch concrete base	3.10
Laying 6-inch concrete roadway (average cost)	2.36

The prices paid for resurfacing and repairing asphalt pavements under one-year contracts which expired June 30, 1920, are as follows:

Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 6-inch concrete base, per square yard	$2.95
Laying sheet asphalt surface (2½ inches before compression), per square yard	1.14
Laying asphalt binder (in connection with resurfacing work) per cubic foot	.46
Laying sheet asphalt surface for repairs, etc., within the space required by law to be kept in repair by street railway companies, per cubic foot	.80
Laying asphalt binder for repairs, etc., within the space required by law to be kept in repair by street railway companies, per cubic foot	.65

SUBURBAN STREETS AND ROADS.

The total of the appropriations for the construction and repair of suburban roads and streets was $426,800.

The paving with asphalt of over a mile of Georgia Avenue from Buchanan Street to the Military Road was a principal item of work which is referred to as a type which should be multiplied in the immediate future in the public interest. The macadamizing of Sixteenth Street from Montague Street to Alaska Avenue was completed during the year. Rhode Island Avenue northeast from Fourth Street to Twelfth Street was paved with sheet asphalt.

Due to the increased cost of material and labor, the amount available was insufficient for the satisfactory maintenance of the roads, and the work was suspended for about one month in the early spring owing to exhaustion of available funds.

MUNICIPAL ASPHALT PLANT.

The District of Columbia has operated a portable municipal plant in the repair of asphalt pavements and bituminous macadam roadways for the past nine years. During the year 1920 the plant was operated for a period of 222 days, with a total output of 179,256 cubic feet of material, or an average of 807 cubic feet daily. This was an increase from the daily output for the fiscal year 1919 of 101 cubic feet. Additional asphalt material for street repairs supplemental to that furnished by the asphalt plant was purchased under contract from the Cranford Paving Co. to the amount of 32,357 cubic feet, the total repair material placed on the streets from both sources during the year being 211,613 cubic feet, or 524 cubic feet in excess of that used in 1919.

The details of the cost of the operation of the plant are contained in the report of the engineer of highways. The cost of the product laid on the street is as follows:

Old material mixture per cubic foot	$0.6003
Asphaltic concrete mixture per cubic foot	.6413
Topping mixture per cubic foot	.6598

The total cost of minor repairs to sheet asphalt pavements during the year, representing a maintenance cost for the year, was $112,602.57. This cost represents the maintenance of all asphalt streets not under guaranty by contractors, a total yardage of 3,334,157. The cost per square yard per year was about 3.38 cents. The like annual cost for previous years was as follows:

	Cents.		Cents.
1908	3.80	1914	1.90
1909	2.30	1915	1.90
1910	2.60	1916	1.80
1911	2.20	1917	1.50
1912	2.40	1918	1.70
1913	2.00	1919	3.07

The marked reduction in the cost of repairs for the year 1917 was due to the fact, that by a law, which became effective that year, repairs to asphalt pavements over one year old were charged to the repair appropriation instead of being done by paving contractors under a five-year guaranty. The yardage of pavement repair was thus increased by nearly 700,000 square yards, on which practically no expenditures were needed, as the pavements were only from one to five years old. The increase of 1919 and 1920 over 1918 is entirely due to increased unit costs of labor and material.

SIDEWALKS AND ALLEYS.

The sum of $220,000 was appropriated for paving sidewalks and alleys in all parts of the District and the sum of $20,000 for laying sidewalks and setting curb around Government buildings, reservations, and parks. Sidewalks are paved with cement under contract. One thousand one hundred and twenty-two square yards of cement concrete pavement were laid in alleys. One-half the cost of curb, sidewalk and alley paving is assessed against abutting property, except that abutting public buildings and public reservations.

The contract price for laying sidewalks during the year was as follows:

For large jobs adjoining paved streets, per square yard	$2.29
For large jobs adjoining unpaved streets and for all small jobs, per square yard	2.49

The initiative in the matter of paving sidewalks and alleys is generally left with the owners of abutting property, the commissioners requiring a majority petition for such work before it is ordered. Exceptions are made, however, in cases where, on account of public danger or other public reason, the paving is demanded. The law require the commissioners to advertise for two weeks their intention to lay sidewalks and curbs and to pave alleys and to give a hearing to the property owners affected. The work is ordered subsequent to such hearing when, in the opinion of the commissioners, it is necessary for the public safety, health, comfort, and convenience. The demand for this class of construction is constant, and increased appropriations for this work could be advantageously expended.

BRIDGES.

The bridge department registered continued progress during the year. Not only were many minor repairs to bridges throughout the District made but among others the following contracts were prosecuted.

Bridge No. 544 (South Dakota Avenue over Baltimore & Ohio Railroad), Contract No. 6675, was completed by the contractor Charles H. Tompkins, February 21, 1920, at a cost of $39,921.28 and Contract No. 6507 with the Cranford Paving Co. for paving the bridge surface with sheet asphalt was completed December 4, 1919, at a cost of $858.77.

Bridge No. 550 (Benning viaduct) Contract No. 6475 with the Snare & Triest Co. was completed July 18, 1919, at a cost of $194,996.62.

Canal wall reconstruction. Contract No. 6815 made with Hyde & Baxter for reconstruction of a portion including both gravity and reinforced concrete sections is being prosecuted.

SURVEYOR'S OFFICE.

SURVEYS FOR PRIVATE PARTIES.

The preceding year showed a vast increase in the volume of work over that of former years, but a still larger amount was turned out during the past year.

The individual lots surveyed during the past year amounted to 2,756, as compared to 1,850 for the previous year. The number of surveys to verify the construction of new walls was 1,175, as compared to 694 for the previous year. A class of work which requires a great deal of time and care is the survey of unimproved agricultural land and the subdivision of same into lots and blocks for recording. The number of these large tracts totaled 13 the past year, as against 6 the preceding year. The total number of orders taken for private work was 5,795, as compared to 3,687 for the previous year.

The total of fees paid to the collector of taxes for private work during the past year was $27,557.85, as compared to $16,456.30 for the previous year, which is an increase of about 68 per cent. The largest total for any one year preceding the past year was in 1910, when a total of $22,891.80 was received. So the amount taken in last year shows this to be a record for this office.

MISCELLANEOUS WORK AND WORK FOR THE DISTRICT OF COLUMBIA.

The number of plats recorded in connection with condemnations and dedications totaled 55, as compared with 28 for the previous year, while the total number of plats drawn, including both public and private, was 6,347, against 5,396 for the previous year.

The total number of surveys, both public and private, was 3,018, as compared to 2,437 for the previous year, and the number of reports made to the inspector of buildings based on the location of new walls being erected was 1,175, as compared to 694 for the previous year.

CONDEMNATION OF STREETS, SMALL PARKS, AND ALLEYS.

The office is required to make surveys and prepare plats for the dedication or condemnation for the opening, widening, straightening, or extension of streets and alleys in the District of Columbia.

Twenty cases for the condemnation of streets and parks are now pending in court and 2 were confirmed during the past year. Of the alley cases there are now 11 in court and 4 have been confirmed during the past year.

PARKS.

Provision was made in the L'Enfant plan for parks in the city of Washington, and the city has been developed inside of Florida Avenue in accordance with that plan. Outside of the cities of Washington and Georgetown no provision was made for parks in the highway plan which was adopted in 1893.

The McMillan Park plan was submitted to Congress in 1902, and this laid down a park plan outside the cities of Washington and Georgetown, but while the District is being developed in accordance with the highway plan, no provision is being made for carrying out this park plan. The result is that large areas are being subdivided into lots and blocks and improved without any provision for parks.

Now, that the stress of other important matters which have occupied our thoughts for several years is past, it is time to turn our attention to the development of the District, and among the many things to be considered there is none that require more serious attention than the question of parks, and the following are submitted in the order of importance, as viewed by this office:

1. Piney Branch Parkway, extending northeasterly from Sixteenth Street and Piney Branch.

2. Klingle Road Valley, extending from the entrance to the Zoological and Rock Creek Parks along the Klingle Road Valley to Woodley Road, crossing Woodley Road at about Thirty-first Street, and then connecting with Normanstone Drive, which lies northerly of Massachusetts Avenue.

3. Fort Hamilton, situated on the Bladensburg Road and the Eastern Branch.

4. Patterson Park. The acquisition of the Patterson tract has been recommended by the commissioners and is much favored by many citizens. There would seem to be some objection to this, however, and it is thought that many who are strongly in favor of this site might be converted to the Fort Hamilton site, provided it is enlarged so as to extend southerly to Bladensburg Road and Benning Road. Fort Hamilton could be made into a wonderful park, which should satisfy the requirements of the northeast section and would be accessible by way of Maryland Avenue (when extended), one of the great avenues of the city leading from the Capitol to Anacostia River Park.

5. Fort Drive (in two sections). (1) That running from Sixteenth Street by way of Fort Stevens, Fort Totten, and Fort Bunker Hill to Anacostia River Park, and (2) connecting Fort Davis by way of Good Hope to Fort Stanton.

6. The Dean Tract at Florida Avenue and Connecticut Avenue NW.

7. Fort Reno Park.

TREES AND PARKINGS.

The number of trees planted along the curbs in the streets of the District of Columbia at the close of the fiscal year was 105,399, an increase over the preceding year of 1,145. The amount expended for the planting and care of trees during the year was $62,466.08.

A number of the trees planted were for the purpose of filling vacancies in existing rows, but the large majority were used in extending the lines into the suburbs and hitherto unplanted localities.

About all of the available ground in the nursery at Fort Dupont is now used, and in a few years it will be impossible to grow the stock fast enough to keep up with the demands of the city. The frequent transfer of the nursery to different locations is a hardship, because many trees are lost in the operation. The past spring about 800 Norway maple seedlings were transferred from the seed beds to the nursery rows.

During the past winter the sycamore trees on Eleventh Street NW., between B Street and Florida Avenue, were severely trimmed—i. e., topped off—because they were in bad shape. These trees have put out a good growth the past spring. The "floating gang" accomplished much trimming on individual requests. There is a great amount of trimming necessary at this time, and it is hoped that this work can be undertaken in the near future. The total number of trees trimmed during the year was 4,009.

The annual appropriation for tree planting has never been adequate, and it would seem that unless there is an increase in the funds the extension of the tree planting will have to be discontinued and the appropriation used to maintain the existing trees on public space.

STREET AND ALLEY CLEANING AND COLLECTION AND DISPOSAL OF CITY REFUSE.

The District of Columbia cleans the streets and alleys, collects the garbage, and reduces it to grease and tankage, and since July 1, 1919,

under authority of Congress, has collected ashes. Miscellaneous refuse was collected and disposed of by contract until the early part of November, 1919, when the commissioners, through the failure of the contractor, were compelled to take over the work of collection and disposal, and operate the salvage plant located at Montello Avenue and Mount Olivet Road NE.

The only work done by contract at the present time is the collection and disposal of dead animals and of night soil. These contracts run to June 30, 1923.

The past winter was more severe than the two preceding winters. It was necessary to remove snow and ice from the streets in the business section, particularly adjoining street-car platforms. In addition to this, the gutters throughout the city were kept open to allow passage of water. The cost of removing snow and ice this year was $16,601.34.

The amount expended for the collection and disposal of garbage was much less this year than the fiscal year 1919. The total cost of the service was $397,983. The products sold amounted to $219,671.77, making the net cost to the District of Columbia for the year of $178,311.57, as compared to the net cost of $265,162.54 the previous year.

The work of collecting ashes was taken over by the commissioners on July 1, 1919. Two collections per week were made during the winter months in the city, and one collection per week was made in the suburban districts: during the summer months only one collection per week was made in both city and suburban territory. A total of 148,243 cubic yards of ashes were collected at a cost, including equipment, of $131,205.98.

The commissioners were seriously handicapped in the collection and disposal of miscellaneous refuse until the necessary additions and repairs to plant equipment had been made, after which the collection and disposal of material was greatly improved.

The total cost of this service, including repairs, betterments to plant, and settlement of outstanding obligations, amounted to $137,679.24. The material salvaged was sold for $102,853.98, making the net cost to the District of Columbia $34,825.26.

Recommendations are made:

1. For the purchase of the necessary property and the construction and erection thereon of a trash plant and stable, the latter to be large enough to accommodate the horses used in the ash service as well as those in trash collection.
2. The erection of a new stable in the northwest section, and the conversion of present stable into a repair shop and storage station.
3. The erection of an incinerator plant for the disposal of general rubbish.

BUILDING OPERATIONS.

The estimated value of building operations, including repairs, during the year, exclusive of operations prosecuted by the Federal Government, was $22,638,862, an increase over the preceding year of $12,130,551, or more than 115 per cent. The maximum value heretofore attained was during the fiscal year 1910, the amount being $16,431,946, a difference of $6,206,916, or 37 per cent plus.

The number of permits issued for buildings, repairs, etc., was 7,525, an increase over the preceding year of 2,577, and the greatest

number of permits ever issued by the building division. The total number of new buildings erected was 2,346, an increase of 748. There were 4,506 dwellings, an increase of 1,072; 26 apartment houses, an increase of 5; and 1,196 business buildings, an increase of 368. The number of permits issued to repair buildings was 4,506, an increase of 1,072.

The distribution of buildings and repairs, in the matter of value, exclusive of awnings and signs, the cost of which is estimated broadly, was as follows:

	Buildings.	Repairs, etc.
Northeast	$277,815	$190,341
Southeast	227,110	140,307
Northwest	7,152,995	1,970,111
Southwest	46,397	152,941
County	11,422,589	1,058,256
Total	19,126,906	3,511,956
	3,511,956	
Sum total	22,638,862	

The estimated number of brick buildings in the District is 68,127; tile, 226; concrete, 61; stone, 2; frame, 27,181. During the year there were erected 1,571 brick buildings, 226 tile, 61 concrete, 2 stone, and 486 frame; and there were razed 73 brick and 111 frame buildings.

Prior to 1920 concrete, tile, and stone buildings were included in the designation "brick."

It will be noted that there was a marked increase in building operations. This was due, of course, in great measure to the cessation of the war and the natural endeavor to regain building normality. But even with full regard for this consideration construction activity far exceeded the degree expected, for the restlessness of labor, the high wages demanded, and the unprecedented cost of building materials, plus the delay and uncertainty in delivery, were retardative in such degree as to discourage builders from assuming contracts. And these conditions have, almost from day to day, grown to such deterrent proportions that only a continuation of the insistent demand for increased building can maintain the high scale reached during the past year.

CONSTRUCTION OF MUNICIPAL BUILDINGS.

During the year two building projects were under construction, as follows:

Building.	Location.
Head house used by the Norfolk & Washington Steamboat Co., repair of damage caused by fire on Mar. 22, 1920.	Water and Seventh Streets SW.
20 portable school buildings	At places designated by the board of education

Plans and specifications were prepared for 60 improvements. The plans and specifications for all the buildings heretofore appropriated for have been completed, with the exception of the Joseph Rodman West School, which was included in the appropriation act of June 5,

1920. These plans should be completed in time to permit the construction work on that building to start next spring.

The latest bids received for the erection of school buildings of standard construction and fire-resisting materials show a cost of 55 cents a cubic foot, which is about three times the cost in 1916.

In the report of the municipal architect 12 recommendations are made for improvements in the service.

REPAIRS TO MUNICIPAL BUILDINGS.

All municipal buildings are kept in repair under the direction of the municipal architect. On account of the increased cost of wages and materials the amount of work done was necessarily curtailed. Demands for repairs on school buildings called for an expenditure of nearly $400,000, while the appropriation for this purpose was only half that amount.

WORKHOUSE AND REFORMATORY.

During the year progress has been made on the construction of the permanent buildings at the workhouse and reformatory. The residence of the physician has been completed and work has been started on the industrial shops and disciplinary dormitories. The railroad work is about 75 per cent completed and the railroad has been put into operation between the wharf on Occoquan Creek and the commissary or storage building at the workhouse. The foundations and floors of the frame buildings at the workhouse have been repaired and the buildings have been closed in and made more waterproof, which should result in a very considerable saving in fuel.

THE DISTRICT BUILDING.

The routine work incident to the care of the District Building involves several distinct functions, viz, the power plant; woodworking, paint, and electrical shops; blue prints and photo shop; printing shop; and the elevator, watch, and cleaning forces. During the year 2,140 tons of coal were consumed, an increase of 225 tons over the preceding year, due, no doubt, to the higher percentage of ash and to the severe winter. Five hundred and ninety-four cubic yards of ashes were removed, at a cost of $534.50. Electric current generated and consumed amounted to 458.480 kilowatt hours. Repairs to the power plant were made, including the installation of a stoker and repairs to the furnace, costing in all $1,116.35. The print shop did a business of $8.537.16, while blue printing and photographing cost $1,550.12. The regular appropriation for the care of the building was $35,000, of which $14,610.52 was expended for coal.

MUNICIPAL GARAGE.

During the fiscal year ended June 30, 1920, there were maintained and kept in running order 41 automobiles. The garage was kept open day and night, all machines being washed and supplied with gas and oil by the night force, who also served as watchmen. A

laboring and mechanical force of eight men made the necessary repairs and operated automobiles for departments having no drivers. A steam vulcanizing outfit was installed. The total operating expense for the maintenance of the automobiles referred to, including gas, oil, tires, and miscellaneous supplies, amounted to $19,721.41, or an average of $481.01 for each car, or $0.077 per mile. The average mileage per car was 6,244 miles, an increase of 298 miles per car over last year.

STABLES.

The stables located at First and Canal Streets SW. are used by the disbursing officer; sewer division; surface division; surveyor; department of weights, measures, and markets; and the assessor's office. The stables located on U Street between Sixteenth and Seventeenth Streets NW. are used by the repair shop and the sewer division and surface division. The employees at these stables include 2 blacksmiths, 4 drivers, 4 watchmen, and 5 stablemen. The number of animals being cared for is 89, i. e., 58 horses and 31 mules. The average cost of forage for an animal for the year was $365.

PLUMBING AND PLUMBING INSPECTION.

During the year the plumbing division made 21,090 regular inspections in the field, as compared with 26,435 the preceding year. While the number of inspections were decreased, this was more than compensated for by the fact that much of the inspection work was in the outskirts of the city and in the outlying sections of the District, due to suburban development, which inspections naturally took much more time, on account of the distance to be traveled between inspections. There was also noted a great increase in complaint cases, due, apparently, to the unsatisfactory relations between tenants and owners on account of the housing situation. The average number of inspections per day per man was 12½ and the greatest number in any one day was 34.

It is estimated that the total cost of new plumbing work installed in private buildings was $1,642,456, and of repairs and remodeling work $864,200. No record was kept of the large amount of plumbing work done under the officers in charge of such work in the General Government buildings.

Of the 34 cases in police court but 2 were dismissed, and a total of $295 was collected in fines.

There were 89 cases prosecuted under the drainage and nuisance acts for failure to connect with sewer or make necessary repairs. There were 5 cases where the work was done by the District and the cost thereof assessed against the property, and the balance, with the exception of 4 cases still pending and under notice, were disposed of through the owner or agent doing the work or otherwise.

PLUMBING BOARD.

There were 24 sessions of the board for examining candidates for licensing as master plumbers and gas fitters. The total number of candidates examined was 42; the number of original candidates exam-

ined for licenses was 16, of whom 1 passed; and of the 19 who had been previously examined for licenses, 3 passed and 16 failed.

PUBLIC CONVENIENCE STATIONS.

The four public convenience stations, located at Seventh Street and Pennsylvania Avenue, Thirteen-and-a-half Street and Pennsylvania Avenue, and Ninth and K Streets NW., and Fifteenth and H Streets NE., were used over ten and one-half million times during the year and the receipts from the compartments, towel rentals, telephone commissions, etc., amounted to $7,003.17. Women used the stations one-eighth as much as the men and contributed about one-tenth of the cash receipts.

Plans for another station at Eighth and F Streets NW. have been completed for some time, but its construction will not be possible until additional funds are available. Additional stations are urgently needed and several locations are now under consideration.

INSPECTION OF STEAM BOILERS.

The number of steam boilers inspected by the inspector of steam boilers during the year was 572, including 73 for the District of Columbia and 9 for the United States Government. Six boilers were condemned as unfit for further use. The compensation of this official is received from the fees paid by owners of the boilers. The total amount of fees reported by him was $2,450, and the expense of inspection $375, leaving a net compensation to him of $2,075.

EXAMINATION OF STEAM ENGINEERS.

The board of examiners of steam engineers held 55 examinations and examined 158 applicants, of whom 60 were found competent and 98 incompetent.

STREET LIGHTING.

There are 20,000 street lamps of all kinds in the District of Columbia, as follows:

Mantle, gas	10,556
Electric arc:	
6.6-ampere magnetite	282
4-ampere magnetite	502
Electric incandescent:	
250-candlepower, series	10
200-candlepower, multiple	64
100-candlepower, series	3,839
100-candlepower, multiple	120
60-candlepower, series	3,773
60-candlepower, multiple	319
Street designation lamps:	
Gas	391
Electric	144
Total	20,000

This was a net increase during the year of 350 lamps.

Additions and extensions have necessarily been confined to some of the more pressing needs in newly occupied unlighted streets, in

alleys of enlarged occupancy, and in connection with certain street improvements, where a deferment of needed changes in lighting would have been an economical waste. Of the 378 lamps added (gross), 287 were either "designation" lamps or the lowest-powered gas or electric.

The improved incandescent electric lighting was extended during the year by the installation of 52 lamps, replacing arcs, in and immediately adjacent to newly improved Ohio Avenue, Twelfth to Fifteenth Streets NW.; 8, replacing gas, in and immediately adjacent to a new "isle of safety," at the intersection of Florida Avenue and Twenty-second Street NW., north of Massachusetts Avenue; 6, replacing lamps of same character long discontinued by reason of building operations, on west side of Vermont Avenue, H to I Streets NW.; and 1 on K Street NW., between Sixth and Seventh Streets. On the viaduct over tracks of the steam railroads at Bennings Road crossing, 22 lamps were placed on posts modeled after the standard ornamental post, but modified to suit the case.

A general change of type of the glass street designation signs, to improve legibility, was inaugurated.

The situation with respect to the several suits brought by the District of Columbia against certain steam railroad companies to compel repayment for the sums expended by the District in maintaining lights along the respective rights of way of such companies has been affected by a rulling of the Court of Appeals that the act of Congress of May 26, 1908, in so far as it requires the Washington Terminal Co. to pay for the lighting of streets, avenues, etc., over and under which its right of way may cross, is constitutional and valid, but not as to the requirement that the company shall pay for the lighting of streets, etc., bordering on its right of way. The judgment of the Supreme Court was reversed, necessitating a new trial. Other pending suits of similar nature have not been pressed, awaiting outcome of the case referred to. An additional suit has been entered on newly accrued claims in the light of the ruling referred to.

SIGNAL SYSTEMS—FIRE ALARM TELEGRAPH, POLICE PATROL SIGNAL AND TELEPHONE SERVICE.

There were 695 fire-alarm boxes in service at the end of the year, 595 on underground and 100 on overhead wires, an increase of 20 over the preceding year; 831 box fire alarms and 962 local alarms were received during the year, of which 110 box and 41 local were false. Additional apparatus for fire-alarm headquarters, to provide for increase in the number of box circuits from 30 to 40 was placed under contract.

There were 464 police-patrol boxes in service at the end of the year, 373 on underground and 91 on overhead wires, an increase of 4 over the preceding year.

There were 1,391 telephones connected to the District system at the end of the year, and 27 in use as portable sets by fire and electrical departments, a net increase of 34 in the year.

The number of cells of storage battery in service on fire alarm, police patrol and local circuits remains unchanged at 2,174.

There were in service on the composite signal systems on June 30, 1920, 161.68 miles of underground cable, containing 6,359.05 miles of

conductors, and 156.61 miles aerial conductor, a grand total of 6,515.66 miles of conductor, a net increase of 49.74 miles of conductor though the total of aerial conductors was decreased by 8.1 miles of conductor. This distribution system has less than sufficient reserve capacity and any considerable District building program would necessitate special expansion.

ELECTRICAL INSPECTION.

The total number of permits issued for installation of wires and apparatus for electric light, heat, and power purposes, on private premises, not including distribution or other plant of public-service companies during the year was 6,099, compared with 3,409 in the previous year, an increase of 2,690 or practically 79 per cent. The total amount of fees paid for permits for such installation was $10,596, compared with $5,709, an increase of $4,887 or nearly 86 per cent. The total number of inspections recorded, relating to this work, was 14,965, compared with 11,837, an increase of 3,128 or but little over 26 per cent. The relation of this last percentage to those preceding is one of the evidences that the limit of physical possibility in proper and adequate inspections with the present force has at least been reached. An increase of personnel is essential.

Supervision was exercised over the erection, taking down, moving, replacing, or resetting of an aggregate of 2,014 line and guy poles and of 229 pole guy anchors, and of the stringing of overhead wires. The total of recorded wire-supporting poles in the District at the end of the year was: Line, 18,600; guy, 1,056; total, 19,656; compared with a total of 19,104 at the end of the preceding year, a net increase of 552. The telephone company has decreased by 7 the number of its poles in streets within the area prescribed in the act of Congress regulating the use of telephone wires, approved June 30, 1902.

The electrical department has cooperated with and assisted the municipal architect and other District officers in preparing plans and specifications, supervision of electric wiring, the remedy of electrical troubles, etc.

HARBOR FRONT.

The annual rentals of wharves and river frontage placed by law under the control of the commissioners are as follows:

Potomac River front	$19,668.60
Anacostia River front	322.50
	19,991.10

The actual water frontage in the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water frontage is about 18 miles, of which about 8 miles is set aside for parks and purposes of the United States. The largest amount of wharf property under control of the commissioners is along the Washington Channel. The total frontage along this channel is 9,275 linear feet, of which 4,675 linear feet, between the grounds of the War College and the south curb line of N Street south, are

under the control of the United States. Of the remaining 4,600 linear feet, 4,041 linear feet are under the jurisdiction of the commissioners, and 559 linear feet, between Thirteenth and Fourteenth Streets, has been designated by Congress as the site of the Federal central heat, light, and power plant.

Along the frontage under the control of the commissioners are located the harbor police station and dock of the harbor boathouse and the dock of the fire boat, the District morgue, the municipal fish wharves and market, and a District property yard. The balance of the frontage is leased to private parties.

On March 22, 1920, the head house of the Norfolk & Washington Steamboat Co. was damaged by fire to the extent of approximately $20,000. The damage was repaired out of the proceeds from the fire insurance.

CONDEMNATION OF INSANITARY BUILDINGS.

The board for the condemnation of insanitary buildings held five meetings and issued orders for the demolition of 124 buildings and the repair of 160 buildings. Of the buildings ordered to be demolished 76 were located on streets and 48 were located on alleys.

Since the creation of the board, May 1, 1906, there has been examined 7,630 buildings, of which 2,389 were demolished and 1,854 repaired. Of the buildings demolished 1,605 were located on streets and 784 on alleys.

The estimated number of tenants required to secure other living quarters through the action of the board in the demolition of buildings since its creation is 6,645. The number of tenants benefited by repairs to buildings required to be repaired by the board is 6,276.

Estimated value of repairs required by the board during the year ended June 30, 1920, is $54,570.

There was completed during the year ended June 30, 1920, a survey of the alleys on which dwellings are located, a census of the inhabitants taken, the number and condition of each dwelling noted on plats showing the location of each alley dwelling, and the character of the buildings located on the street fronts of the squares in which alley dwellings are located.

SEWERAGE SYSTEM.

The construction and maintenance of the sewerage system and the sewage disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer, District of Columbia.

The length of main and pipe sewers constructed during the year was 8.47 miles. The total length of main and pipe sewers on June 30, 1920, was 746.31 miles, of which 149.29 miles are main sewers and 597.02 miles are pipe sewers. There was expended during the year on the sewerage system the sum of $312,153.90, and on the sewage disposal system $60,545.68. The total cost of the sewerage system to June 30, 1920, was $14,726,759. The cost of the sewage disposal system to the same date was $5,918,970, making a total cost of the complete system to June 30, 1920, $20,645,729.

SEWER CONSTRUCTION.

The following table shows the length and cost of sewers constructed during the year:

Section.	Length.	Cost.
	Feet.	
1. County west of Rock Creek	12,766	$39,121.82
2. County east of Rock Creek	15,850	113,497.00
3. County west of Anacostia River	5,424	22,179.31
4. County east of Anacostia River	3,563	68,126.05
5. Washington City	7,234	72,498.61

In the informing report of the sanitary engineer will be found details of comprehensive drainage studies and continued consideration of river conditions as affected by sewage discharge. While the conditions of river waters at and below outfalls were generally very good, and throughout the year fair, yet they indicate the need in the future of the installation of sewage treatment works. The design of such works is under study.

Extracts from his report, relating to the sewage disposal system and the Metropolitan sewerage district, follow:

SEWAGE DISPOSAL SYSTEM.

The main sewage pumping station was in continuous operation throughout the year, handling the sewage of practically the entire district and also the storm water from the 900-acre low area within the dyke lines. At the main pumping station sewage to the amount of 25,406,639,000 gallons and 548,900,000 gallons of storm water were pumped during the year, an increase of 17,760,000 gallons of sewage over the amount pumped the previous fiscal year. At the Poplar Point pumping station 759,226,000 gallons of sewage were pumped, an increase of 290,174,000 gallons over the quantity pumped during the previous fiscal year. At the Woodridge pumping station sewage to the amount of 19,849,800 gallons were pumped during the year.

The existing sewage outfalls of the disposal system on the Potomac River were under observation throughout the year, and the river conditions in the vicinity were generally unobjectionable during the year, but the continuing drop in oxygen, falling below 50 per cent may be considered as a warning that the installation of the sewage treatment works can not be safely deferred for a much longer period. Under appropriation approved August 31, 1918, proceedings are in progress for acquiring the site for these treatment works.

METROPOLITAN SEWERAGE DISTRICT.

The Metropolitan sewerage project, which contemplates the removal of all sewage from Maryland towns now entering small streams which flow into and through the national parks in the District of Columbia, by connecting the Maryland sewerage to the sewage disposal system of the District of Columbia, awaits both the completion of the District interceptors and the construction of the connecting sewers by the Maryland commission. No beneficial results can accrue under the authority granted by Congress until these District interceptors and Maryland connecting sewers are built. Meanwhile, the serious contamination of park streams by the dis-

charge of raw sewage from these Maryland towns is increasing. Bacteriological examinations of the waters of the streams indicate constant and serious pollution.

This project was originally proposed in the annual report of the sanitary engineer for the fiscal year 1909, from which the following is abstracted:

> The only practical solution of this problem is believed to be in the formation of a Metropolitan district, under the control of a State and National board, with power to construct the necessary valley interceptors for the removal of the sewage, and that these interceptors be arranged so as to discharge at the State line into the interceptors of the sewage disposal system of the District of Columbia, the District to be reimbursed for the cost of pumping and handling the sewage from the Maryland towns and villages by a State-collected tax levied upon the communities benefited, which would also defray the cost of construction and maintenance of the State system.

WATER MAINS.

During the year 31,288 feet, or 5.9 miles, of water mains were laid, making the total length of mains now in service 639 miles. There were also in service at the end of the year 11,004 valves of various sizes, 3,649 fire hydrants, 232 public hydrants, 17 sanitary fountains, 157 horse fountains, and 44 public wells.

The aggregate cost of the water mains in service June 30, 1920, paid from water department funds, was $4,139,194.16.

WATER CONSUMPTION.

The mean daily consumption for the year was 62,553,490 gallons, being practically 1,875,000 gallons less than the mean daily consumption for 1919, making a per capita consumption of 143 gallons.

The total pumpage for the year was 11,623,215,260 gallons.

Underground leakage discovered and stopped during the year amounted to 1,098,912 gallons daily.

The total amount of coal burned was 7,494 tons.

The cost of operating pumps for the year was $107,326.98, making a total operative cost of pumping 1,000,000 gallons of water into the mains of $10.83.

WATER REVENUES AND EXPENDITURES.

The revenues from all sources, including a balance of $217,647.35, amounted to $1,069,575.78. Expenditures of the distribution system amounted to $736,952.43, advances on account of the Washington Aqueduct to $168,819.22, leaving a balance of $163,804.13. This balance is obligated to the amount of $46,298.67, which leaves an unobligated balance of $117,505.46.

Of the total cost of work done during the year, 27.8 per cent was for new work and 72.2 per cent for maintenance.

WATER METERS.

During the year only 98 water meters were installed. The increased cost of labor and material, as well as the scarcity of the former, precluded the possibility of extensive work of this kind dur-

ing the year. The average cost of installing meters for the year was $27.19.

The amount of revenue collected under the meter system was $686,459.57; under flat rate, $80,748.34; and for building purposes, $3,953.64.

The total number of services at the end of the year was 72,149, of which number 61,365, or 85 per cent, are metered.

ZONING THE NATIONAL CAPITAL.

The Commissioners of the District of Columbia have for a number of years been interested in the subject of zoning, which is now universally regarded one of the essential features of a comprehensive city plan. The war caused the matter to be set aside, but after the Armistice, it was again taken up. A committee of citizens of the District of Columbia was appointed to advise and assist the Commissioners in the formulation of a law which would authorize the preparation of a comprehensive zoning plan for the District. The bill prepared in this manner was passed by the two Houses of Congress without material change, and was approved by the President on March 1, 1920. This act created a zoning commission to consist of the Commissioners of the District of Columbia, the Officer in charge of Public Buildings and Grounds of the District of Columbia, and the Superintendent of the United States Capitol Building and Grounds, and directed the commission, within six months after passage of the act, to divide the District of Columbia into height, area, and use districts, and to adopt regulations specifying the height and area of buildings therein to be erected or altered, and the purpose for which buildings and premises therein might be used.

The District has had for many years a law limiting the height of buildings, which law has been enforced through the inspector of buildings. Building regulations have also restricted the owner of the property somewhat as to the area of the lot which might be occupied by buildings. No attempt, however, had heretofore been made to restrict the use to which buildings might be put, except in cases where the proposed business constituted a nuisance, in which case the consents of property owners within a specified radius were required. Zoning regulations, however, go very much further and specify for all buildings hereafter erected or structurally altered restrictions as to height, area, and use, which apply generally over districts into which the city is divided.

At the first meeting of the zoning commission, Col. C. W. Kutz, Corps of Engineers, United States Army, the Engineer Commissioner of the District of Columbia, was selected as its chairman. Mr. Harland Bartholomew, of St. Louis, who had an active part in the zoning of that city and of several other cities of the United States, was selected as consultant to the commission, as it was realized that while Washington as the Capital City of the Nation presented certain problems which belonged to it alone, the principles must be the same here as in other cities.

As the commission was required by law to formulate and put its regulations into effect within six months after the passage of the act, and as the act appropriated only a very small sum for the expenses of said commission, it was necessary to secure from all branches

of the District Government as many employees as could be spared and put them to work upon collection of data required by the commission. Maps were prepared showing the height, area, and use of all existing buildings within the District. Other maps indicated the height, area, and use of buildings erected during the past five years, thus providing a picture of existing conditions and of the trend of building activities.

From a study of these maps and other available data, and from observation throughout the District, the commission drew up tentative regulations and maps showing the proposed division into districts. After public hearings, these tentative regulations and maps were revised. As to height, the District of Columbia is divided into four districts—a 110-foot district, an 85-foot district, a 55-foot district, and a 40-foot district. In any one of these districts no new building can exceed the maximum height indicated by the name of the district. Similarly, the District is divided into four use districts, namely, residential, first commercial, second commercial, and industrial. In the residential district only dwellings of various types, hotels, private clubs, churches, etc., may be erected. In the first commercial district office buildings, retail business, theaters, etc., are permitted, as well as anything authorized in the residential district. In the second commercial district all uses permitted in the residential or first commercial districts are authorized, and, in addition, such other uses as are not so obnoxious or objectionable as to be restricted in their location to the fourth or industrial district. Similarly, the District was divided into four area districts, known, respectively, as A, B, C, and D, in each of which a different percentage of lot occupancy was authorized. This percentage is most restrictive in the residential districts, in which the necessity for light and ventilation and the desirability of open spaces are greatest.

The final regulations and maps were not adopted until after the close of the fiscal year (Aug. 30, 1920). They are enforced by the Commissioners of the District of Columbia through the inspector of buildings, and control, in conjunction with the building regulations, all building activities for which permits might be applied for subsequent to that date.

It is believed that the passage of the zoning law and the adoption of regulations thereunder marks a most important and far-reaching step in the advancement of the National Capital, as this law and the regulations adopted thereunder by conservation of property values, prevention of undesirable encroachment of one class of building upon another, and consequent promotion of the general welfare will better both the living conditions and commercial conditions of the city and aid in its symmetrical and beautiful development.

REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA.

REPORT OF THE ASSISTANT TO THE ENGINEER COMMISSIONER.

OFFICE OF THE ENGINEER COMMISSIONER
OF THE DISTRICT OF COLUMBIA,
Washington, D. C., September 17, 1920.

SIR: I have the honor to transmit herewith annual reports giving in detail the operations during the fiscal year ending June 30, 1920, of the various divisions and offices comprising the surface section of the engineer department. In forwarding these reports it is desired to lay stress upon the need of obtaining in the immediate future the long-expected and much-deserved salary increases for annual employees.

In addition, recommendations are emphasized relative to several of the divisions of the surface section, as follows:

REFUSE DIVISION.

Trash.—With the failure of the trash contractor to properly perform his work, the District took over his plant and equipment about the middle of the fiscal year. With this acquisition, the four major operations of the city refuse division—street cleaning, the collection and disposal of garbage, ashes, and trash—are to-day carried on as municipal functions. The period for which the trash contract pertains expires on July 1, 1921, at which time the District will make final settlement with the contractor, and from then on will have to make use of its own plant and equipment for the collection and disposal of trash. It is essential that arrangements therefor be completed prior to July 1, 1921.

The arrangements necessary for disposal will have to provide for a capacity much beyond that of the present plant which takes care of trash only from householders. Daily it is becoming more and more difficult to find dumping places to waste the trash from stores and business houses and the many Government buildings. The new arrangements must provide for the disposal of this additional material and thus take care of the entire trash produced in the city.

Garbage.—During the two years of municipal operation of garbage service very little money has been spent in order to better conditions of disposal as the District has been using the old reduction plant and equipment which was purchased rather cheaply from a former contractor. Prior to becoming involved in any large expenditure, it was

desired to gain experience, and then after sufficient study of the situation to make a determination as to a proper disposal policy.

This has been done, and after consideration of various propositions, including disposal to pig feeding contractors, it has been determined that immediate steps should be taken to generally overhaul and elaborate the present reduction plant. Also new railroad equipment should be purchased in order that transportation to Cherry Hill may be carried on economically. This program as a whole is not only justified decidedly from the viewpoint of economy but also because it will insure that certainty of satisfactory service demanded by the nature of the class of refuse in question.

Stables.—In the estimates for trash plant and equipment must be a provision for stables with a practicable central location for the animals used in that service.

The present stables used for the collection of ashes were obtained from the late ash contractor. The buildings are mere makeshift shacks located on ground which can be rented only on a month-to-month lease. There is no shelter for wagons which have to be parked out in the weather. A municipal ash stable is necessary and should be constructed in combination with that for the trash service in a central location.

Due to recent expansion of the city a new stable for general refuse service is required. In order to lessen much of the expensive long animal haul necessary under present conditions this stable should be located well out in the northwest section of the city east of Rock Creek, and should be provided with facilities for transferring collections from animal drawn to motor transportation.

TREES AND PARKING DIVISION.

Appropriations.—Unless an amount of money is made available commensurate with the scope of the work of this division there is soon going to be a noticeable retrogression in the beauty of Washington's trees. The least curtailment of spraying because of lack of funds permits caterpillars and other injurious insects to multiply rapidly. They become a nuisance to residents and pedestrians and may readily result in the complete defoliation of the trees. At present the work of trimming and other tree maintenance is far behind what it should be. With present appropriations it is impracticable to replace the dead trees scattered throughout the older portions of the city, let alone carry out planting in the newer sections where at present there are no street trees.

Weeds.—It is a generally accepted fact that weed cutting is justified from a sanitary and health standpoint. With its available funds the trees and parking division is able to make but small progress in cutting weeds on parkings and tree spaces along sidewalks in front of open lots and vacant houses. Expenditures for such purpose are an indirect tax against citizens in general. It would be a more just procedure, and weeds would be effectively controlled if abutting property owners could be taxed directly for the work. It is therefore recommended that legislative authority be obtained enabling assessment for the cost of necessary weed cutting.

Tree spaces.—Many an otherwise beautiful street vista is marred in Washington by dirty, washed out, and below grade tree spaces.

Some citizens make a real effort to maintain these spaces and their results are depreciated by indifferent neighbors. This could be remedied if the District were enabled to take care of such neglected tree spaces on the assessment system. Such is not a radical proposition, as it is working successfully in other cities, and inquiries from many Washingtonians indicate that legislative authority enabling the sodding of tree spaces on the assessment system would be welcomed.

HIGHWAY DIVISION.

Repairs to suburban roads.—The appropriations for the maintenance of suburban roads have recently been inadequate. This deficiency not only affects the main arteries of travel leading into the city as to the poor condition of which there has been much publicity, but also affects many side streets in well built-up residential areas, and further, many miles of temporary road improvements through sparsely settled districts. In the aggregate a large number of people are dependent on these minor improvements, and though for each single case but a small expenditure is required in order to make travel possible through the winter, the total sum is considerable. A substantial increase should be appropriated over that at present available for "Repairs to suburban roads."

Paving by the permit system.—Cases have arisen where short sections of streets have been entirely built up with houses and the residents therein have had to pass through many long months without street improvements pending the submission of specific estimates to Congress. These people would willingly deposit the half cost for paving if the highway division could thereupon complete the work under the permit system, as is now done in the case of sidewalks and alleys. It is recommended that Congress be requested to authorize to a limited extent such street paving.

Site for plant and equipment.—The highway division now occupies, with storehouses, stables, and shops, a section of park on Canal Street SW., which the office of public buildings and grounds is desirous of having vacated. The municipal asphalt plant is located in the line of New York Avenue NE., for the opening of which avenue grading and bridge construction has been started. In obtaining a new and permanent site for the asphalt plant, storehouses, etc., it is recommended that the opportunity be taken to purchase one with railroad facilities, which are much needed.

SURVEY DIVISION.

Additional personnel.—Real estate operations, building construction, and the work of the title companies are all dependent upon the office of the surveyor. It is important that the work of this office be kept fully up to date. Though the volume of demands upon the surveyor have increased extensively, no additions to his working force have been made for many years. It is recommended that the personnel be increased so as to be commensurate with the work of to-day.

Very respectfully,

F. S. BESSON,
Major, Corps of Engineers, United States Army, Assistant to Engineer Commissioner, District of Columbia.

To the ENGINEER COMMISSIONER.

REPORT OF ENGINEER OF HIGHWAYS.

WASHINGTON, D. C., *September 8, 1920.*

SIR: I have the honor to submit the following report of the operation of the engineer of highways for the fiscal year ended June 30, 1920. The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the highway division aggregated $1,698,792, of which $220,000 was for paving sidewalks and alleys in all parts of the District; $727,560 for paving new roadways and repairing old roadway pavements; $426,800 for construction and repair of suburban roads; $30,000 for construction and repair of bridges and viaducts; $30,000 for grading streets and avenues; $20,000 for sidewalks and curbs around Government reservations, buildings, and parks; $244,492.21 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

Summary of work under appropriation for improvement and repairs for year ended June 30, 1920.

Character of work.	Streets and avenues.	Suburban roads and streets.	Repairs to asphalt pavements.	Total.
*Sheet asphalt pavement.....square yards..	42,086.64	6,554.39	12,492.72	61,133.75
Asphalt surface.....do....	.....	.....	22,882.35	22,882.35
Asphalt block pavement.....do....	.....	.....	.....	.....
Vitrified block gutters.....do....	2,908.96	396.70	1,737.06	5,042.72
Cement concrete pavement.....do....	13,380.79	40,505.83	.....	53,886.62
Macadam roadway.....do....	.....	43,148.00	.....	43,148.00
Cobble and granite gutters.....do....	.....	10,566.98	.....	10,566.98
Cement gutters.....linear feet..	.....	2,540.47	.....	2,540.47
Old pavement removed.....cubic yards..	.....	.....	2,092.84	2,092.84
Old cobble and granite removed.....square yards..	13,871.10	861.90	.....	14,733.00
Granite and bluestone curb set.....linear feet..	7,585.90	4,114.81	3,107.82	14,808.53
Cement curb formed and laid.....do....	.....	17,131.54	.....	17,131.54
Curb reset.....do....	20,453.75	4,974.82	7,937.09	33,365.66
Grading.....cubic yards..	14,252.12	78,302.30	1,573.75	94,128.17
Sidewalks and curbs under assessment and permit work.....square yards..	.....	.....	.....	25,749.22
Sidewalks and curbs around Government reservations.....square yards..	.....	.....	.....	8,250.33
Sidewalks, whole cost.....do....	.....	.....	.....	23.00
Alley pavements, assessment work:				
Asphalt block.....	.....	.....	.....	.....
Vitrified block.....	.....	.....	.....	.....
Cement.....	.....	.....	.....	14,122.00

The following is a list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1920.

Tables B and C.—Statement of character and extent of street pavements.

Table E.—Schedule of work on streets and avenues and county roads and suburban streets.

Table F.—Repairs to asphalt and coal-tar pavements.

Table G.—Work done for street railways companies.

Table H.—Work done by day labor under appropriation for "Repairs to streets, avenues, and alleys."

Table I.—Regular permit work.

Table K.—Assessment work.

Table L.—Replacing and repairing sidewalks and curbs around public reservations.

Table M.—Miscellaneous work.

Table N.—Whole cost work.

Table O.—Repairs to cuts by plumbers and others.

Table P.—Grading streets, alleys, and roads.

Of the above tables, A, B, and C and O are printed herewith. The remaining tables are on file in the record room of the office of the engineer of highways, plan case No. B-990.

The dominating characteristics of the year's work were scarcity of materials, especially such as were subject to railroad transportation, and specifically, as to the latter, cement and broken stone. Labor shortage was not controlling, being subordinated as a deterrent to progress by the shortage of material. High costs continued and were accentuated, but the morale of the working force was improved. Such delays as occurred in completion of the year's program within the year—and there were some—was really due to delay in receipt of material, and in this respect the failure of the District to furnish material to be supplied by it was, if anything, more pronounced than the like failure of our contractors to secure their own.

The paving with asphalt of over a mile of Georgia Avenue, from Buchanan Street to the Military Road, was a principal item of work which is referred to as a type which should be multiplied in the immediate future in the public interest. The paving with Durax of Water Street NW. from Rock Creek to Wisconsin Avenue, and of Water Street SW. from Eleventh to Fourteenth Streets, with asphalt is approaching completion and are notable improvements which should be extended to further limits. A small fraction of our concrete roadways and our concrete sidewalks is still to be completed; the delay, both past and present, being the slow receipts of cement. In other respects the year's work is completed. Repairs to suburban roads were inadequately conducted, due to exhaustion of funds, a condition long anticipated. Unfortunately, the two deficiency appropriations for this purpose were so tardily provided that the gangs had to be withdrawn to other work for two different intervals, and the condition of the highways was regrettably bad for a considerable time and large extra cost was incurred in the effort to restore them over what a well-regulated, continuous upkeep would have required.

Alleys were paved with cement concrete to the extent of 14,122 square yards.

MUNICIPAL ASPHALT PLANT.

The total output of the municipal asphalt plant for the year was 179,256 cubic feet of material, consisting of 164,400 cubic feet of old material mixture, 9,984 cubic feet asphaltic concrete mixture, and 4,872 cubic feet of topping mixture. The plant was operated for 222 days, with an average daily output of 807 cubic feet. In connection with the output of the plant the crusher was operated for 98 days during the year and 4,708 cubic yards of old material hauled to the plant from the various streets was crushed.

Constant attention is given to the maintenance of both the plant and the crusher, repairs being made and parts replaced when necessary, thereby keeping them in the best operating condition possible. This cost is incorporated in the total cost of output shown below.

The following materials in amounts set forth below were purchased for use in manufacturing the output during the year:

Limestone dust, 250 tons, cost average	$4.40
Sand, 2,890.50 cubic yards, cost average	2.10
Screenings, 243 tons, cost average	.80
Asphaltic cement, 422.61 tons, cost average	18.61
Asphaltic cement, 60 tons, cost average	24.61

There were purchased for use in operating the crusher and mixer the following large items:

Fuel oil, 33,468 gallons, cost average	$0.047
Coal, 180 tons, cost average	7.00
Wood, 59½ cords, cost average	15.50

The cost of operation, including labor and material, are kept from day to day and the summary of this data for the fiscal year develops the following unit costs for the year's operation:

Operation of crusher.

Period of operation, 98 working days; output of crusher, 4,708 cubic yards.

Labor and fuel	$6,596.26
Cost per cubic yard, $1.40.	
Maintenance, renewals, and repairs	424.48
Cost per cubic yard, $0.0901.	

Overhead cost: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

Cost of crushed product per cubic yard:	
Labor and material	$1.40
Repairs to plant	.0901
Total cost	1.4901

Operation of plant.

Period of operation, 222 days; total output, 179,256 cubic feet.

At plant:	
Labor (7.59 cents per cubic foot)	$13,613.02
Fuel oil (0.9 cent per cubic foot)	1,643.00
Coal (0.76 cent per cubic foot)	1,370.25
Wood (0.2 cent per cubic foot)	360.26
Total (9.45 cents per cubic foot)	16,986.53
Haul from plant to street:	
Labor (8.78 cents per cubic foot)	15,576.96
On street:	
Labor (22.84 cents per cubic foot)	40,542.96
Painting joints (0.36 cent per cubic foot)	651.35
Wood (0.2 cent per cubic foot)	360.26
Total (23.40 cents per cubic foot)	41,554.57
Maintenance and repairs:	
At plant (1.98 cents per cubic foot)	3,567.05
On street (1 cent per cubic foot)	1,779.72
Total (2.98 cents per cubic foot)	5,346.77

Overhead: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

Supervision:	
Foremen and overseers (4.15 cents per cubic foot)	7,442.30

Total manufacturing cost per cubic foot:

	Cents.
Plant labor	9.45
Hot haul	8.78
Street work	23.40
Maintenance of plant and tools	2.98
Supervision	4.15
	48.76

The sand used was bought under contract at 80 cents per cubic yard and hauled from the wharf to the plant at a cost of $3,755.46 for 2,890.50 cubic yards, or $1.30 per cubic yard, a total of $2.10 per cubic yard. All other expendable material was delivered at the plant site at the cost thereof used herein.

The cost of a cubic foot of old material mixture from the above was as follows:

0.65 cubic foot of old material, at $1.49 per cubic yard	$0.0359
0.35 cubic foot sand, at $0.80 per cubic yard, hauled $1.30 per cubic yard	.0273
3.12 pounds limestone dust, at $4.40 per ton	.0069
4.58 pounds asphaltic cement, at $18.61 per ton	.0426
Cost of material	.1127
Manufacturing and placing cost	.4876
Total cost per cubic foot	.6003
Asphaltic concrete mixture:	
0.50 cubic foot screenings, at $0.80 per ton (2,000 pounds)	.0204
0.50 cubic foot sand, at $0.80 per cubic yard, hauled $1.30 per cubic yard	.0389
4.20 pounds limestone dust, at $4.40 per ton	.0092
9.16 pounds asphaltic cement, at $18.61 per ton	.0852
Cost of material	.1537
Manufacturing and placing cost	.4876
Total cost per cubic foot	.6413
Topping mixture:	
1 cubic foot of sand, at $0.80 per cubic yard, hauled $1.30 per cubic yard	.0778
4.20 pounds limestone dust, at $4.40 per ton	.0092
9.16 pounds asphaltic cement, at $18.61 per ton	.0852
Cost of material	.1722
Manufacturing and placing cost	.4876
Total cost per cubic foot	.6598

The total cost of minor repairs to sheet asphalt pavements during the year, the same representing the maintenance cost during the year, was $112,602.57. This cost represented the maintenance of all asphalt streets not under guaranty by contractors, a total yardage of 3,334,157. The cost per square yard per year was therefore about 3.38 cents.

For purposes of record and comparison the like annual costs are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 cents; 1919, 3.07 cents.

The municipal asphalt plant began operations in 1912, repairs being made by contract during the first quarter of that year, and with the municipal asphalt plant during the last three quarters of that year and continuously since. The marked reduction for the year 1917 is affected very significantly by the law effective that year by which repairs to pavements over one year old is chargeable to repair appropriations instead of being paid for by the paving contractors under a five-year guaranty, as formerly. The yardage of pavement over which our repairs were distributed was thus increased by nearly

700,000 square yards, on which practically no expenditures were needed, as the pavements were only from 1 to 5 years old.

In connection with these costs of annual repair it should be considered that some of the streets approximate an age of 40 years and that the average age of those that we have resurfaced in recent past years exceed 25 years. The average age of streets resurfaced in 1910 was 25.8 years; in 1911, was 24.5 years; in 1912, was 25.8 years; in 1913, was 26 years; in 1914, was 28.5 years; in 1915, was 28 years; in 1916, was 29.6 years; in 1917, was 27 years; in 1918, was 26 years; in 1919, was 26.7 years; in 1920, was 23.6 years.

During the year there was purchased from the Cranford Paving Co., under contract No. 6798, the following material in bulk at contractor's plant, to be used in connection with the minor repairs to asphalt pavements and repairs to cuts:

16,944 cubic feet of topping, at 48 cents per cubic foot	$8,133.12
15,412.8 cubic feet binder, at 38 cents per cubic foot	5,856.86
	13,989.98

This material was hauled from the plant and laid in the streets by the District of Columbia minor repair forces.

The reason for the above procedure was the abnormal need for repair work on our streets due to war activities and an effort to prevent their deterioration under such excessive use by heavy trucks and other increment of traffic. The plant alone could hardly have fully met such a demand and was not subjected to the injurious strain of attempting it. The prices paid for the material purchased were about equal to our own cost of production with a 15 per cent addition thereto.

My acknowledgements are due to the employees of this division for the work accomplished by the office during the year.

I transmit herewith the reports of the engineer of bridges, the superintendent of streets, the superintendent of suburban roads, and the superintendent of stables.

Very respectfully,

C. B. HUNT,
Engineer of Highways.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Statement showing employees temporarily required in connection with street, road, and bridge construction and repairs, and appropriations and deposits from which paid during fiscal year ended June 30, 1920:

SURFACE DIVISION.

Designation.	Number.	Rate per diem.
Assistant engineer	4	3 at $6.50 per day; 1 at $6 per day.
Computer	4	1 at $6 per day; 1 at $5.45 per day; 1 at $5 per day; 1 at $4.50 per day.
Copyist	1	1 at $4.50 per day.
Inspectors	15	1 at $5.45 per day; 12 at $4.50 per day; 1 at $4 per day; 1 at $3.50 per day.
Overseers	8	1 at $5.45 per day; 1 at $5.35 per day; 6 at $4.50 per day.

Appropriations from which paid.

Improvements and repairs, D. C., 1920	$44,642.53
Street improvements, D. C., 1920	5,974.69
	50,617.22

The above is a statement showing employees temporarily required in connection with street, road, and bridge construction and repairs, and appropriations and deposits from which paid during the fiscal year ended June 30, 1920.

REPORT OF THE SUPERINTENDENT OF STREETS.

WASHINGTON, D. C., *September 8, 1920.*

SIR: I submit herewith the annual report of the operations under my charge for the fiscal year ending June 30, 1920.

Table H is a summary of work done by day labor under the appropriation for current repairs to streets, avenues, and alleys. The cost of such work was $120,173.97.

Table I is a list of work done under the permit system, wherein the property owners requested the improvement and paid one-half cost, the District paying the other half. The cost was $19,769.43.

Table K is a list of work done under the assessment system. One-half the cost of such work is charged against the abutting property. The total cost was $144,496.65.

Table L is a list of the work paid from the appropriation for replacing sidewalks and curbs around public reservations. The amount expended was $22,137.97.

H. N. MOSS,
Superintendent of Streets.

The ENGINEER OF HIGHWAYS.

Repairs to streets, avenues, and alleys, appropriation 1920, under supervision of superintendent of streets.

Brick sidewalk relaid	square yards	9,404
Asphalt block paved	do	753
Asphalt block repaved	do	11,566
Vitrified block paved	do	914
Vitrified repaved	do	4,741
Macadam roadway	do	1,785
Curb reset	linear feet	1,205
Flag relaid		817
Granite block laid	square yards	5,718
Asphalt tile relaid		687
Cement walk relaid	square yards	3,218
Cobble relaid	do	3,301
Grading	cubic yards	3,741
Labor		$111,807.34
Material		$8,366.63

Summary.

Northwest section, east of Sixteenth Street	$29,793.80
Northwest section, west of Sixteenth Street	19,176.28
Northeast section	23,163.30
Southeast section	19,582.64
Southwest section	22,491.56
Georgetown	5,966.39
Total	120,173.97

REPORT OF THE SUPERINTENDENT OF SUBURBAN ROADS.

WASHINGTON, *September 8, 1920.*

SIR: The following report of work during the fiscal year ended June 30, 1920, is respectfully submitted:

REPAIRS TO SUBURBAN ROADS.

The appropriations for repairs to suburban roads for the fiscal year 1920 were $255,000, the expenditure of which was distributed as in-

dicated in table filed in the office of the engineer of highways. The principal items of expenditure were for the repair of the macadamized main highways, of which some of the most important were as follows:

Bladensburg Road NE	$7,194.00
Connecticut Avenue NW	8,783.00
Rittenhouse Street, Blair Road to Georgia Avenue NW	2,936.00
Streets in Sauls Subdivision	3,378.00
Wisconsin Avenue NW	4,489.00
Georgia Avenue NW	4,463.00
Sixteenth Street NW	4,631.00
Michigan Avenue NE	3,027.55
Watering various roads	2,014.00
Fourteenth Street NW	3,990.00
Rhode Island Avenue NE	3,457.59
Nichols Avenue SE	2,404.07

In addition to items for special locations, the following amounts were expended for minor repairs:

In section 1	$15,850.21
In section 2	14,045.41
In section 3	8,644.55
In section 4	9,041.90

Due to the increased cost of materials and labor, the amount available was insufficient for the satisfactory maintenance of the roads, and work was suspended for about one month in the early spring, owing to exhaustion of available funds. The weather in the late winter of 1919–20 was extremely destructive to all classes of roadways and at the same time was unfavorable to work. In addition, the greatly increased use of heavy motor trucks, carrying loads of 5 to 10 tons besides the weight of the truck, has subjected the suburban roads to a duty for which they were never designed, rendering their maintenance unduly burdensome and expensive, and in many cases making their entire reconstruction at an early date necessary.

Based upon the experience of the last three years the following recommendations are made, viz:

First. That all of the heavily traveled trunk highways which are now located in accordance with street extension plans shall be paved with pavements of a fixed character as rapidly as it is possible to secure funds.

Second. That waterbound macadam roadways and streets of secondary importance be resurfaced with bituminous macadam.

Third. That restrictive legislation be obtained limiting the permissible weight carried by motor vehicles.

CONSTRUCTION OF SUBURBAN ROADS AND SUBURBAN STREETS.

New items for this work were included under the head Street Improvements (see table).

Among the most important items were the following:

The macadamizing of Sixteenth Street NW. from Montague Street to Alaska Avenue was completed during the year; Rhode Island Avenue NE. was paved from Fourth Street to Twelfth Street; and the paving with asphalt of Georgia Avenue from Buchanan Street to Military Road was partly completed.

GRADING STREETS, ALLEYS, AND ROADS.

The appropriation for this work amounted to $30,000, all of which was expended for comparatively small items of necessary grading, most of the work being done by contract. (See table.)

L. R. GRABILL,
Superintendent Suburban Roads, D. C.

The ENGINEER OF HIGHWAYS.

REPORT OF THE ENGINEER OF BRIDGES.

WASHINGTON, *August 25, 1920.*

SIR: I have the honor to submit the following report of the operations under my charge for the fiscal year ending June 30, 1920.

The expenditures from the appropriation for the construction and repair of bridges were as follows:

Bridge No.	Character of work.		Cost.
7	Aqueduct Bridge, repairs		$278.87
20	Pierce Mill, construct abutment		882.41
27	Connecticut Avenue over Klingle Road, construct wall		451.55
27	Connecticut Avenue over Klingle Road, paint handrail		210.33
29	Connecticut Avenue over Rock Creek, paint handrail		58.91
30	Calvert Street over Rock Creek, repairs		59.31
30	Calvert Street over Rock Creek, refloor dummy		1,717.58
34	P Street over Rock Creek, repairs		2.93
34	P Street over Rock Creek, refloor		1,697.57
56	Nichols Avenue at Sheridan Road, repair parapet		27.06
54	Pennsylvania Avenue over Anacostia River, refloor portion		4,414.01
54	Pennsylvania Avenue over Anacostia River, refloor portion		5,555.17
			15,355.70
	Dangerous holes and minor repairs:		
	July, 1919	$199.69	
	August, 1919	357.54	
	September, 1919	75.30	
	October, 1919	258.42	
	November, 1919	401.42	
	December, 1919	0.00	
	January, 1920	78.16	
	February, 1920	219.71	
	March, 1920	20.79	
	April, 1920	27.09	
	May, 1920	33.29	
	June, 1920	472.79	
			2,144.20
	Allowance for automobile		360.00
	Tools		195.94
	Coal (estimated)		41.04
	Salaries		4,924.48
	Lumber (estimated)		12,157.00
	Construction materials other than lumber (estimated)		1,740.13
	Paint		402.06
	Miscellaneous		345.81
	Contract with Cranford Paving Co		185.00
			37,851.36
	Less materials purchased from other appropriations		10,169.39
	Total net expenditures		27,681.97
	RECAPITULATION.		
	Appropriation		25,000.00
	Repayment by railway companies		3,007.52
	Repayment for Aqueduct Bridge repairs		306.75
			28,314.27
	Total net expenditures		27,681.97
	Balance		632.30

Bridge No. 1 (Chain Bridge). Lumber purchased for reflooring one-half.

Bridge No. 7 (Aqueduct Bridge). Lumber purchased for reflooring under authorization of the United States Engineer Office.

Bridge No. 20 (Pierce Mill Road over Rock Creek). Construction of new abutment begun, incomplete due to cement shortage. Materials purchased for reflooring and for emplacing iron handrail.

Bridge No. 27 (Connecticut Avenue over Klingle Road). Retaining wall constructed at east corner of south abutment and handrail painted.

Bridge No. 30 (Calvert Street over Rock Creek). Dummy refloored.

Bridge No. 34 (P Street over Rock Creek). Refloored.

Bridge No. 54 (Pennsylvania Avenue over Anacostia River). Lumber purchased for reflooring one-half. Reflooring of entire bridge incomplete due to difficulty in securing lumber. Four panels surfaced with sheet asphalt under contract with the Cranford Paving Co., at a cost of $185.

Bridge No. 55 (Anacostia Bridge). Draw span refloored and housing erected over draw machinery. Electrical machinery furnished and installed in south control house under contract with Shull Co., at a cost of $135. Material purchased for replacing fenders on draw piers.

Bridge No. 198 (Fiftieth Street NE. over Watts Branch). Plans prepared for construction of reinforced concrete bridge.

Bridge No. 544 (South Dakota Avenue over Baltimore & Ohio Railroad). Contract No. 6675 with Charles H. Tompkins completed February 21, 1920, at a cost of $39,921.28. Contract No. 6507 with the Cranford Paving Co. for paving bridge with sheet asphalt completed December 4, 1919, at a cost of $858.77.

Bridge No. 550 (Benning Viaduct). Contract No. 6475 with the Snare & Triest Co. was completed July 18, 1919, at a cost of $194,996.62.

Canal wall reconstruction. Contract No. 6815 made with Hyde & Baxter for reconstruction of a portion, including both gravity and reinforced concrete sections. Work incomplete.

Sand and gravel wharf. Repaired under contract No. 6808 with the John Troutt Construction Co., at a cost of $4,812.66. Additional work was done by day labor and material furnished, at a cost of $633.82.

Norfolk & Washington Steamboat Co. wharf. Reconstruction completed and granite-block pavement laid, at a cost of $27,719.13.

Wharf No. 6 (Water Street between M and N Streets SW.). Bids received for reconstruction and rejected as excessive. Bids were then requested for the removal of structures on the present wharf.

The most important projects for consideration are:

Widening and strengthening Calvert Street Bridge, the estimated cost of which is $208,000.

Replacement of Chain Bridge to provide adequately for present-day traffic.

Construction of a bridge to take the place of the existing highway and railway bridges which carry Benning Road over Anacostia River. This is a feature of the development of Anacostia Park. Estimated cost, $470,000.

Replacement of the bridge crossing the Anacostia River in the line of Pennsylvania Avenue. Plans for this bridge have not been made. This is also a feature in the development of Anacostia Park.

The plans for the connecting parkway in Rock Creek Valley will require the replacement of the bridges at M and at P Streets to afford adequate headroom for the driveways.

D. E. McComb,
Engineer of Bridges.

To the Engineer of Highways.

REPORT OF THE SUPERINTENDENT OF STABLES.

Sir: I have the honor to submit the following report showing the operation of the stables under the care of the superintendent of stables, engineer department, District of Columbia, for the fiscal year ended June 30, 1920.

Location of stables: First and Canal Streets SW.; U Street NW. between Sixteenth and Seventeenth.

Number of employees, annual: One superintendent, one blacksmith, one driver, and three watchmen.

Number of employees, per diem: Four stablemen, 1 watchman, and 40 drivers.

Number of horses and mules and departments to which assigned.

	Horses.	Mules.
Disbursing office	1	.....
Electrical department	1	.....
Repair shop	18	.....
Sewer department	14	20
Surface department	18	12
Surveyors office	2	.....
Weights, measures, and markets	3	.....
Assessor	2	.....
Emergency	2	.....
Total	61	32

Cost of forage, etc.

Forage (allowance for one animal for one month):	
100 pounds rye straw, straight No. 2, at $0.96 per 100 pounds	$0.96
210 pounds long timothy hay, at $1.985 per 100 pounds	4.17
210 pounds mixed clover hay, at $1.992 per 100 pounds	4.18
384 pounds oats, at $2.47 per 100 pounds	9.48
50 pounds bran, at $2.09 per 100 pounds	1.05
Total per month	21.94
Forage for one animal for one year	238.08
Shoes, etc., $2.30 per month	27.60
	265.68

B. J. Lynch,
Superintendent of Stables.

To the Engineer of Highways.

TABLE A.—*Street railroads in operation in District of Columbia June 30, 1920.*

Name of company.	Underground electric.		Overhead electric.		Total.
	Double track.	Single track.	Double track.	Single track.	
Washington Railway & Electric Co.	23.19	6.34	26.77	3.99	60.29
Capital Traction Co.	20.19	4.30	3.57	.....	28.06
Washington & Virginia Co.	.....	.46	.....	.....	.46
East Washington Traction Co.	.....	.....	.....	.50	.50
Washington Interurban Co.	.....	.....	.....	2.65	2.65
Washington & Maryland Co.	.....	.....	.....	2.33	2.33
Total	43.38	11.10	30.34	9.47	94.29
Tracks used in common by Capital Traction Co., and Washington Railway & Electric Co.	1.55	.....	.....	.....	1.55
Track used in common by Washington Railway & Electric Co., and Washington & Virginia Co.	.70	.....	.....	.....	.70
Total	45.63	11.10	30.34	9.47	96.54

TABLES B AND C.—*Character and extent of roadway pavements July 1, 1920.*

SQUARE YARDS.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete.	Durax block (small granite block).	Granite and rubble.
Northwest city	1,794,553	25,323	9,674	6,372	20,999	12,294	103,334
Northeast city	393,843	200,671	3,127	.....	5,108	.....	18,289
Southeast city	234,164	249,573	8,019	4,082	.....	.....	37,605
Southwest city	275,222	40,436	13,535	.....	8,972	.....	160,354
Georgetown	153,972	23,076	4,144	905	.....	.....	36,166
Northwest suburban	325,424	84,046	25,855	36,680	155,877	.....	23,945
Northeast suburban	61,916	6,925	14,354	.....	18,814	.....	5,971
Southeast suburban	14,494	.....	.....	3,049	12,353	.....	1,000
	3,253,588	630,050	78,708	51,088	222,123	12,294	386,664

Section.	Vitrified block.	Cobble.	Macadam (estimated).	Gutters on asphalt streets.	Gutters on asphaltic concrete streets.	Pavements maintained by street railroads.	Total.
Northwest city	9,855	19,660	25,023	118,014	1,128	287,110	2,433,339
Northeast city	3,882	.....	41,203	31,584	231	69,316	767,254
Southeast city	.....	13,122	46,700	16,640	898	48,328	659,131
Southwest city	3,138	9,246	10,300	24,215	1,254	56,820	603,492
Georgetown	515	12,618	3,000	5,750	498	31,816	272,460
Northwest suburban	.....	.....	1,350,987	25,470	5,871	54,765	2,088,920
Northeast suburban	.....	.....	396,972	5,031	1,049	9,000	520,032
Southeast suburban	.....	.....	80,371	5,633	272	7,370	124,542
	17,390	54,646	1,954,556	232,337	11,201	564,525	7,469,170

TABLES B AND C.—*Character and extent of roadway pavements July 1, 1920*—Con.

MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete.	Durax block (small granite block).
Northwest city	92.17	1.57	0.51	0.24	1.15	0.30
Northeast city	20.59	8.99	.19	.....	.35	.....
Southeast city	12.58	12.43	.43	.17	.....	.....
Southwest city	14.98	2.37	.68	.....	.25	.....
Georgetown	9.14	1.51	.49	.06	.....	.....
Northwest suburban	18.05	4.52	1.31	2.00	8.52	.....
Northeast suburban	4.10	.63	.97	.....	1.04	.....
Southeast suburban	1.21	.....	.....	.21	.51	.....
	172.82	32.02	4.58	2.68	11.82	.30

Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unimproved (estimated).	Total.
Northwest city	5.61	0.50	1.02	1.15	2.54	106.76
Northeast city	.91	.24	.....	2.28	4.44	37.99
Southeast city	2.19	.....	.66	2.21	7.15	37.82
Southwest city	8.25	.27	.41	.52	2.62	30.35
Georgetown	2.39	.03	.64	.06	.76	15.08
Northwest suburban	1.13	.....	.....	84.47	52.23	172.23
Northeast suburban	.61	.....	.....	28.30	42.61	78.26
Southeast suburban	.04	.....	.....	6.30	35.37	43.64
	21.13	1.04	2.73	125.29	147.72	522.13

TABLE O.—*Number of square yards and cost of repairs to cuts in various streets, avenues, and alleys during the fiscal year ended June 30, 1920.*

Item No. 1 shows the cost of repairs to cuts charged various plumbers, public service corporations, and individual depositors. Ten per cent is added to "whole cost work" for the maintenance of the miscellaneous trust deposits (District of Columbia) operating account, streets, this fund being used to pay for labor, tools, various materials, etc., used in connection with the repairing of cuts.

Item No. 2 shows the cost of work done on account of various appropriations of the sewer department.

Item No. 3 shows the cost of work done on account of the water department.

Item No. 4 shows the cost of work charged against other appropriations of the District of Columbia and various appropriations of the general Government.

Item No. 5 shows the number of square yards of various kinds of pavements repaired.

	Flat rate.	Whole cost.	Total.
Item No. 1:			
Plumbers	$14,855.97	.....	$14,855.97
Corporations	36,381.96	$147,111.63	183,493.59
Individual depositors	7,306.44	295.11	7,601.55
Item No. 2:			
Sewer department	1,597.00	4,160.17	5,757.17
Item No. 3:			
Water department	6,074.54	2,840.74	8,915.28
Item No. 4:			
Miscellaneous appropriations	12,089.45	11,779.90	23,869.35
Total	78,305.36	166,187.55	244,492.21

TABLE O.—*Number of square yards and cost of repairs to cuts in various streets, avenues, and alleys, etc.*—Continued.

	Square yards.		
	Flat rate.	Whole cost.	Total.
Item No. 5:			
Sheet	$3,275.78	$4,753.59	$8,029.37
Vitrified block	1,042.03	2,134.76	3,176.79
Asphalt block	1,867.41	2,598.11	4,465.52
Granite block	576.63	5,432.26	6,008.89
Cobble	121.51	324.84	446.35
Cement sidewalk	7,339.37	.....	7,339.37
Brick sidewalk	2,722.78	8,283.43	11,006.21
Macadam	1,388.56	1,047.45	2,436.01
Durax block	20.29	8,022.69	8,042.98
Scoria block	16.16	2,076.87	2,093.03
Wood block	3.33	217.64	220.97
Gravel	3.18	.....	3.18
Concrete roadway	594.30	35.45	629.75
Total	18,971.33	34,927.09	53,898.42

Total number of charges made for repairing cuts, etc., 8,100.

REPORT OF THE CITY REFUSE DIVISION.

WASHINGTON, *September 1, 1920.*

SIR: I have the honor to submit the following report of the operations of the city refuse division, engineer department, for the fiscal year ended June 30, 1920.

The operations covered by this division included the cleaning of streets and alleys, for which there was an appropriation of $400,000, the collection and disposal of garbage, the collection of ashes, and the supervision of contracts for the collection and disposal of trash, dead animals, and night soil under a general appropriation for the disposal of city refuse of $656,000.

STREET CLEANING.

The yardage cleaned, the methods employed in this work, and the cost of each is shown in tables accompanying this report.

Snow and ice work costing $16,601.34 was done during the winter months. Snow and ice were removed from congested areas in the business section, particularly adjoining street-car platforms and at street intersections where piles of snow obstructed traffic. In addition to this, all gutters throughout the city were opened to allow the free passage of water.

The refuse from the Center, Western, and Eastern Markets, heretofore disposed of through special appropriation for this purpose, was handled the past year by the street-cleaning section at a total cost of $958.54.

GARBAGE COLLECTION AND DISPOSAL.

A statement is submitted herewith showing cost of garbage collection and garbage disposal. The collection service this year cost $208,430.41, as compared with a net cost of $282,190.22 the previous year. The reduction service cost was also reduced from $210,026.60

in the fiscal year 1919 to $192,771.37 for this year. The revenue from grease and tankage sold amounted to $216,589.85, as against a revenue last year of $227,046.56, making the net cost of plant and operation for this year $186,611.93 as against $265,162.54 the previous year.

The difference in revenue is accounted for by the fact that the raw garbage delivered to the reduction plant was less rich in grease than during the previous year and that 466 tons less than in previous year was collected. This was less than 1 per cent of the total, but the amount of grease produced was 10 per cent less than last year.

This clearly indicates that the law permitting the transportation by private individuals of table refuse to points outside of the District of Columbia to be fed to poultry and pigs resulted in the garbage richest in fats being selected by these pig feeders and the lean garbage left for the city to collect.

The average price received from grease was this year 9.7 cents, as against 9 cents last year. The average price of tankage was $12.11 this year, as against $12.27 last year.

In the bill making appropriations for the District of Columbia for the year 1921 the authority for the transportation of garbage outside of the city limits was revoked, and it is expected this action will result in greater revenue from grease and tankage produced at the reduction plant.

The experiment referred to in the last annual report, of feeding garbage to hogs, was concluded during the fall of 1919, and it was shown that under favorable conditions this might be a profitable means of disposing of garbage. However, after careful analysis the conclusion is reached that it is not wise for the District to abandon its reduction plant at Cherry Hill and to change its method of disposal of garbage by letting a contract to a pig feeder. Such procedure has too many elements of danger of failure, in which event the loss to the District and the inconvenience to its citizens would outweigh any possible monetary gain. The plant at Cherry Hill, while old and much run down, is a valuable asset and worthy of betterment and remodeling to make it more economical of operation. Recommendation is made in the estimates for funds sufficient to attain this end.

ASHES.

Under authority which the Congress granted the commissioners to conduct as municipal functions the operations involved in the collection and disposal of city refuse of every kind, on July 1, 1919, the commissioners took over the work of collecting ashes instead of letting this work by contract, as had been the practice theretofore. A total of 148,243 cubic yards of ashes was collected from householders, at a cost of $131,205.98, which sum included the purchase of equipment to the amount of $18,841.77.

MISCELLANEOUS REFUSE.

In the early part of November, 1919, through the failure of the contractor to carry on the work of collecting and disposing of miscellaneous refuse, it became necessary for the commissioners to take over this work and to operate the contractor's salvage plant located

at Montello Avenue and Mount Olivet Road. The plant was new, but inadequate in certain respects, and the equipment for collection was insufficient and badly out of repair. It was, therefore, necessary immediately upon the taking over of this work to provide additional equipment for collection purposes and to construct additions and to purchase betterments to the disposal plant in order to place it in an economically operative condition.

The cost of collecting this miscellaneous refuse, including the sum expended in betterments and renewals, was $61,901.61. Material to the value of $102,853.98 was salvaged from this collected trash at a cost (including all payments for plant betterments, amounting to $16,631.17) of $75,777.63. The total expenditures, therefore, were $137,679.24, and the excess of expenditures over receipts $34,825.26. Had the contractor continued to operate under his contract, the District would have paid him for this work during these eight months $23,600.

The contract is for a period of three years, which terminates July 1, 1921. On this date the District will have no right to use the contractor's plant which they are operating for the life of the contract only, and it will therefore be necessary to purchase or lease this plant or to build one to carry on this work at some other site.

The need for a general disposal plant for miscellaneous refuse is urgent. This has come about quite suddenly by reason of the acquisition by the Federal Government of practically all of the lowland adjoining the Anacostia River heretofore used for general dumping. This land is to be converted into a park, and it is being filled by dredging, so that miscellaneous dumping thereon is no longer desired. This leaves the city without low ground available for filling with miscellaneous trash. There is still low ground privately owned where, with the permission of the proprietors, ashes and dirt may be deposited, but in none of these places can trash be dumped without nuisance.

The trash plant which the District is now operating takes care only of the refuse from householders, but there is a large amount of material from stores and business houses, as well as from the many Government buildings, which must be disposed of somewhere.

The solution of this situation would seem to be the erection of an incinerator, located on the water front, where this trash would be burned and the residual ash towed away in scows and dumped in shallow water adjoining the District-owned property at Blue Plains or deposited to form an island in the Potomac River below the bridges leading to Virginia.

The only city refuse still handled by contract are those for the disposal of dead animals and for the collection and disposal of night soil. Both of these contracts have until June, 1923, to run, and both were satisfactorily carried on by the respective contractors without the imposition of fines.

In addition to recommendation for much-deserved increases in compensation to annual employees in this division, three other main recommendations are made in the estimates:

1. For the purchase of the necessary property and the construction and erection thereon of a trash plant and stable, the latter to be large enough to accommodate the horses used in the ash service as well as those in trash collection.

2. The erection of a new stable in the northwest section and the conversion of present stable into a repair shop and storage station.

3. The erection of an incinerator plant for the disposal of general rubbish.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

Very respectfully,

MORRIS HACKER,
Supervisor City Refuse.

Maj. F. S. BESSON, U. S. A.,
Assistant to the Engineer Commissioner.

Cost of street cleaning July 1, 1919, to June 30, 1920.

	Area.	Cost.
	Yards.	
Machine cleaning	98,350,000	$40,915.64
Alley cleaning	55,344,000	44,239.33
Suburban cleaning	34,550,000	24,231.40
Hand patrol [1]	1,173,802,000	237,490.76
Flushing [1]	7,112,000	3,056.26
Motor flushing [1]	17,321,000	3,779.65
Squeegeeing [1]	111,008,000	24,743.81
Sprinkling		4,125.56
Dumpmen		7,777.80
Property accounting		2,302.99
Waste paper boxes		1,330.94
Snow and ice		16,601.34
Annual overhead		2,593.54
Total		413,189.02

[1] Hand patrol and washing total, 1,173,802,000 yards, $269,070.48.

Yearly cost of cleaning by various methods.

Class of work.	Average thousand yards under attention.	Total cost.	Average cost for each thousand yards under attention for year	Thousand yards cleaned.	Average number of cleanings for year.
Hand patrol [1]	4,590	$237,490.76	$51.70	1,173,802	250
Machine sweeping	912	40,915.64	44.90	98,350	109
Alley cleaning	1,145	44,239.33	38.65	55,344	49
Suburban streets	2,093	24,231.40	11.60	34,550	16
Squeegeeing	3,026	24,743.81	8.20	111,008	37
Flushing (horse and motor combined)	820	6,835.91	8.35	24,433	30

[1] Hand patrol work is habitually in combination with squeegeeing and flushing.

Table showing comparative data in connection with street-cleaning work, 1916 to 1920.

SQUARE YARDS CLEANED.

	1916	1917	1918	1919	1920
Hand patrol	1,052,765,000	1,024,688,000	879,574,000	748,142,000	1,173,802,000
Machine sweeping	218,852,000	219,869,000	205,504,000	218,682,000	98,350,000
Alley cleaning	67,842,000	65,471,000	49,878,000	57,208,000	55,344,000
Suburban streets	50,127,000	58,940,000	38,393,000	32,876,000	34,550,000
Squeegeeing	187,794,000	169,566,000	125,520,000	89,868,000	111,008,000
Flushing	23,696,000	27,485,000	16,776,000	5,539,000	24,433,000
Motor flushing		6,135,000	12,621,000	12,213,000	

Table showing comparative data in connection with street-cleaning work, 1916 to 1920—Continued.

DIRECT TOTAL COST.

	1916	1917	1918	1919	1920
Hand patrol	$138,571.03	$148,401.40	$165,521.33	$195,665.33	$237,490.76
Machine sweeping	31,405.83	37,583.20	49,242.68	77,555.50	40,915.04
Alley cleaning	22,155.20	24,221.64	30,018.51	45,118.53	44,239.33
Suburban streets	15,900.32	20,164.21	18,986.48	20,540.42	24,231.40
Squeegeeing	20,037.40	20,566.73	21,141.04	20,929.32	24,743.81
Flushing	5,033.32	7,829.54	7,566.84	2,757.63	6,835.91
Motor flushing	.....	721.60	3,964.29	4,418.61	

COST PER 1,000 SQUARE YARDS.

	1916	1917	1918	1919	1920
Hand patrol	$0.132	$0.145	$0.189	$0.261	$0.292
Machine sweeping	.144	.171	.239	.354	.416
Alley cleaning	.326	.371	.603	.789	.800
Suburban streets	.....	.....	.....	.625	.702
Squeegeeing	.106	.121	.168	.233	.223
Flushing	.212	.285	.450	.497	.279
Motor flushing	.....	.....	.314	.361	

Total cost of street cleaning, including all charges, except interest on investment and depreciation	$413,189.02
Population served	437,580
Cost per capita per year	$0.95

Table showing comparative data in connection with disposal of all city wastes from 1916 to 1920.

NUMBER OF UNITS COLLECTED.

	1916	1917	1918	1919	1920
Garbage ... tons	52,207	44,683	48,874	53,258	52,793
Ashes ... cubic yards	135,305	151,783	127,363	134,673	148,228
Miscellaneous refuse ... do	157,180	149,810	163,291	149,650	170,286
Night soil ... barrels	12,741	11,227	11,300	11,111	12,734
Dead animals ... number	22,724	24,562	22,891	19,974	19,995

TOTAL NET COST.

	1916	1917	1918	1919	1920
Garbage	$69,788.00	$69,756.00	$69,290.00	$267,662.54	$178,311.57
Ashes	68,935.00	59,052.00	68,922.64	100,300.00	114,248.38
Miscellaneous refuse	28,187.00	27,954.25	26,318.75	51,204.00	46,522.26
Night soil	14,990.00	14,994.00	14,998.00	17,500.00	17,500.00
Dead animals	2,988.00	2,988.00	2,988.00	3,360.00	3,360.00

Miscellaneous data on contracts.

Class of waste.	Contractor.	Period of contract.	Date of expiration.	Price per annum.	Collected from—
Refuse [1]	J. J. Whitehead (Inc.)	3 years	June 30, 1921	[2] $54,000 [3] 35,400 [4] 15,000	Residences, small boarding and lodging houses, small apartments.
Dead animals	Chas. F. Mann	5 years	June 30, 1923	3,360	Every part of the District.
Night soil	Warner Stutler	do	do	17,500	All privies in the District.

[1] Refuse contract defaulted Nov. 4, 1919, District continuing work.
[2] First year.
[3] Second year.
[4] Third year.

Statement showing total cost of garbage service.

COLLECTION SERVICE.

Equipment	$5,822.97
Labor	124,672.94
Coal	1,415.00
Rent	1,800.00
Materials and supplies	31,596.68
Forage	28,761.92
Livery	150.00
Miscellaneous expenses	474.57
Supervision	20,196.33
	214,890.41
Less repayments	6,460.00
Gross cost of collection service	208,430.41

REDUCTION SERVICE.

Equipment	$3,424.35
Labor	73,441.14
Coal	29,880.00
Freight on garbage	19,094.81
Freight, miscellaneous	905.19
Rent of garbage cars	5,268.00
Car repairs	2,377.99
Repairs to railroad siding	372.96
Rent	416.14
Materials and supplies	23,724.32
Forage	438.00
Miscellaneous expenses	4,909.51
Chemical analysis	336.50
Mileage	450.00
Press cloth	15,982.18
Burlap	1,119.20
Press racks	4,675.00
Supervision	6,200.00
	193,015.29
Less credits	243.92
Gross cost of reduction service	192,771.37

COLLECTION SERVICE.

Gross cost of collection service July 1, 1919, to June 30, 1920	$208,430.41
Inventory June 30, 1920, of equipment purchased July 1, 1919, to June 30, 1920—$5,822.97, less 10 per cent depreciation	5,240.68
Net cost of collection service	203,189.73

REDUCTION SERVICE.

Grease production, July 1, 1919, to June 30, 1920—1,853,496 pounds	179,667.66
Tankage production, July 1, 1919, to June 30, 1920—3,047.64 tons	36,922.19
Inventory June 30, 1920, of equipment purchased July 1, 1919, to June 30, 1920—$3,424.35, less 10 per cent depreciation	3,081.92
Total receipts from production and equipment inventory June 30, 1920	219,671.77
Gross cost of reduction service July 1, 1919, to June 30, 1920	192,771.37
Profit, July 1, 1919, to June 30, 1920, on reduction service	26,900.40

HOG FEEDING.

Amount expended July 1, 1918, to June 30, 1919	$7,013.75	
Amount expended July 1, 1919, to June 30, 1920	2,052.82	
Total expenditure for hog feeding	9,066.57	
Receipts from sale of hogs	7,044.33	
Loss on hog feeding		2,022.24

RECAPITULATION.

Net cost of collection service	203,189.73
Net cost of hog feeding	2,022.24
	205,211.97
Profit on reduction service	26,900.40
Net cost of entire garbage service July 1, 1919, to June 30, 1920	178,311.57

Statement showing receipts and expenditures of miscellaneous refuse service Nov. 4, 1919,[1] to June 30, 1920.

COLLECTION SERVICE.

Betterments:		
10 new trash wagons	$1,800.00	
Building trash-wagon body complete	225.00	
Building trash-wagon body and rebuilding gears of trash wagons	1,658.00	
Making wagon covers	88.26	
		$3,771.86

[1] Contractor defaulted Nov. 4, 1919, District of Columbia then seizing plant and continuing work.

Operation:				
Supplies and repair parts:				
Forage		$6,102.25		
Wagon parts		1,092.82		
Oil, gas, grease		250.96		
Harness and parts		197.91		
Supplies, miscellaneous		2,115.06		
Repairs, miscellaneous		4,413.36		
Use, care, and feed of horses		2,440.20		
Tires		364.72		
		16,977.28		
Miscellaneous account:				
Livery	$255.00			
Western Union Telegraph Co	9.84			
American Railway Express Co	.47			
Chesapeake & Potomac Telephone Co	.60			
		265.91		
Total operation cost, other than labor			$17,243.19	
Labor cost:				
Weekly labor rolls		32,501.26		
Increase compensation on labor rolls		7,710.30		
			39,761.56	
Total betterments, supplies, repairs, and labor			60,776.61	
Plant overhead:				
Foreman		975.00		
Increased compensation		150.00		
			1,125.00	
Total direct expenditures collection service				$61,901.

REDUCTION SERVICE NOV. 6, 1919, TO JUNE 30, 1920.

Plant betterments:				
Electric motor			$195.48	
Installing motor			86.00	
Platform scales			20.80	
Barrel trucks			33.98	
Drayage on trucks			1.35	
Motor-power baler			1,470.00	
Freight on baler			46.80	
Installing and wiring baler			72.00	
Armature			91.00	
Electric motor			306.55	
Partial payment on Packard auto truck			1,715.46	
Building bridge at plant			69.20	
Building platform at plant			129.40	
New fence			1,057.58	
Balance on—				
3 balers			4,250.00	
Belt			1,026.00	
Incinerator			4,139.33	
Moorman account			1,920.24	
Operation:				
Supplies and repair parts—				
Fire irons	$13.56			
Push brooms	7.58			
Miscellaneous minor repairs to plant	5,653.62			
Miscellaneous supplies	1,591.00			
Repairs to smokestack	54.09			
Signs	28.03			
Wire	597.11			
Crates	288.57			
		$8,233.56		
Coal account—				
Coal		449.22		
Hauling—				
R. D. Snider	1,075.53			
Lawless & Sons	4,359.66			
East Washington Transfer Co	55.55			
J. H. Houser	889.42			
		6,380.16		
Miscellaneous account—				
Chesapeake & Potomac Telephone Co	95.62			
American Railway Express Co	6.63			
Potomac Electric Power Co	267.42			
Livery	210.00			
Magazine subscriptions	16.00			
L. M. Cook	4.00			
Western Union Telegraph Co	.91			
Recorder of deeds	.80			
		601.38		
Total operation cost other than labor			15,664.32	

Labor cost—		
Weekly labor rolls	$40,333.80	
Total betterments, supplies and repairs, and direct labor	72,629.29	
Plant overhead—		
Superintendent, foreman, typist	3,148.34	
Total direct expenditures reduction plant		$75,777.63
Total direct expenditures collection and reduction service		137,679.24
Revenue:		
Sales of salvaged material	$84,778.74	
Accounts receivable June 30, 1920	13,419.09	
Inventory of salvaged material June 30, 1920	4,656.15	
Total sales accounts receivable and salvaged material		102,853.98
Excess expenditures over receipts		34,825.26

RECAPITULATION.

Excess expenditures over receipts	34,825.26
Amount paid on contract to Nov. 1, 1919[1]	11,697.00
Total cost of miscellaneous refuse service	46,522.26

Statement showing cost of ash service.

Labor		$81,054.53	
Less repayments		15,000.00	
			$66,054.53
Equipment	$18,841.77		
Materials and supplies	26,577.19		
Forage	27,063.69		
Coal	151.28		
Rent	1,320.00		
Miscellaneous expense	312.11		
		74,266.04	
Less repayments		15,891.26	
			58,374.78
Supervision			6,776.67
Gross cost of ash service			131,205.98
Inventory June 30, 1920, of equipment purchased July 1, 1919, to June 30, 1920—$18,841.77, less 10 per cent depreciation			16,957.60
Net cost of ash service			114,248.38

REPORT OF THE INSPECTOR OF ASPHALTS AND CEMENTS.

WASHINGTON, *August 21, 1920.*

SIR: I have the honor to submit the following report showing the operations of this division during the fiscal year ending June 20, 1920.

The work of this division represented by the number of tests made show a decrease of about 13 per cent as compared with the previous year. The principal decrease being in the testing of hydraulic cements, due to District and contractors' inability to procure this commodity owing to lack of shipping facilities.

Total number of samples tested 8,011, against 9,347 during the year 1919.

ASPHALT PAVEMENTS.

During the year there were laid by the Cranford Paving Co., contractors for laying new asphalt pavements, approximately 84,021 square yards in which Aztec, Bermudez, and Standard asphalt were used.

[1] Contractor defaulted Nov. 4, 1919, District of Columbia continuing work.

The municipal asphalt plant produced about 179,256 cubic feet of asphalt, concrete, and topping used in the patching and repairs to asphalt pavements in which Aztec and Standard asphalt were used.

PORTLAND CEMENT.

Tested 5,961 samples, representing 59,647 barrels, of which 231 barrels were rejected. Results of tests and by whom submitted are shown in tables Nos. 7 and 8 accompanying.

All work has been kept current and is current to date.

J. O. HARGROVE,
Inspector of Asphalts and Cements.

ASSISTANT TO ENGINEER COMMISSIONER.

Total number of samples tested.

Asphalts:	
Aztec	41
Bermudez	1
Standard	40
Trinidad	1
Asphalt mixtures:	
Binder	9
Cement (binder)	149
Cement (topping)	165
Cement (District of Columbia asphalt plant)	207
Topping mixtures	381
Concrete mixture	2
Topping (old surface material)	13
Cement, Portland	5,961
Oils:	
Flux	1
Fuel	4
Road	10
Pitch, paving	4
Sands	713
Stone:	
Binder	75
Limestone dust	5
Trap-rock screenings	4
Miscellaneous	225
Total	8,011

NOTE.—The results of the above tests are on file in this office subject to reference.

REPORT OF THE SURVEYOR.

WASHINGTON, *September 24, 1920.*

SIR: This office herewith submits the following report of work for the year ended June 30, 1920, which includes the condemnation of streets and avenues, parks and alleys:

SURVEYS FOR WHICH A FEE IS CHARGED (SURVEYS FOR PRIVATE PARTIES).

The table herewith submitted shows the relation of the work done for the past year, as compared with that for the preceding year. The preceding year showed a vast increase in the volume of work

over that of former years, but a still larger amount was turned out during the past year, as will be shown by this report.

The individual lots surveyed during the past year amounted to 2,756, as compared to 1,850 for the previous year. The number of surveys to verify the construction of new walls was 1,175, as compared to 694 for the previous year. The number of large tracts of unimproved agricultural land subdivided into lots and blocks and recorded in this office totaled 13, as against 6 for the previous year. This class of work requires a great deal of time and care.

The number of orders taken for private work of every character amounted to 5,795, as compared to 3,687 for the previous year. This is an average of over 18 orders per day for private parties only, which, of course, does not include any work done for the United States Government and the District of Columbia.

The total of fees paid to the collector of taxes on account of orders taken for private work was $27,557.85, as compared to $16,456.30 for the previous year. This is an increase of about 68 per cent. An examination of the records will show this to be a record for this office. The largest total receipts for any one year previous to this was in 1910, when a total of $22,891.80 was received.

I wish to state that this extra work placed upon the office was done with the same number of employees as we had on our rolls in 1910, with a handicap during the past year resulting from the personnel of the force constantly changing, and some of the help being very unskilled. Much credit is due the older men in the service, who have become very efficient in this class of work.

MISCELLANEOUS WORK AND WORK FOR THE DISTRICT OF COLUMBIA.

There were 55 plats recorded in connection with condemnations and dedications, as compared with 28 for the previous year.

There were 1,175 reports made to the inspector of buildings concerning the location of new walls being erected, against a total of 694 for the previous year.

The total number of plats drawn, both public and private, was 6,347, and the total number of surveys, both public and private, 3,018.

CONDEMNATIONS FOR STREETS, PARKS, AND ALLEYS.

This office is required to make surveys and prepare plats for the dedication or condemnation for the opening, widening, straightening, or extension of streets and alleys in the District of Columbia.

There are now pending in court 20 cases providing for the condemnation of streets and parks. Two cases were confirmed during the past year.

There are 11 alley cases now in court, and 4 have been confirmed during the past year.

PARKS.

In the L'Enfant plan for the Federal city of Washington provision was made for parks, and the city has been developed inside of Florida Avenue in accordance with that plan, which has made the city famous. Outside of the cities of Washington and Georgetown the highway

plan was adopted in 1893, but this did not make any provision for parks.

The McMillan park plan was submitted to Congress in 1902, and this provided for a park plan outside of the city of Washington and Georgetown, but while the District is being developed, as required by law, in accordance with the highway plan, there is no provision for carrying out this park plan. The result is that large areas of the District are being subdivided into lots and blocks and improved without any provision for parks. If this condition is permitted to continue, the entire District will be subdivided and improved without adequate provision for parks. This would be most unfortunate, for after it is discovered that such a condition has occurred it will be too late to provide parks without an enormous expense, and then only after much of the natural beauty so attractive for parks has been forever destroyed.

It is gratifying to know that the board of trade's committee on streets and parks is actively at work endeavoring to have a park plan consummated.

Now that the stress of other serious matters which has occupied our thoughts for several years is past, it is time to turn our attention to the development of the District, and among the many things to be considered there is none more important or none that requires more serious attention than the question of parks, and I wish to invite your attention to those that seem to demand first consideration and submit the following in the order of importance, as viewed by this office:

1. *Piney Branch Parkway*, extending northeasterly from Sixteenth Street and Piney Branch. This would connect with Piney Branch Parkway into Rock Creek Park and the Zoological Park. This valley is fast being destroyed by development, and if something is not done to preserve its beauty it will be lost as a suitable tract for a park.

2. *Klingle Road Valley.*—This extends from the entrance to the Zoological and Rock Creek Parks along the Klingle Road Valley to Woodley Road, crossing Woodley Road at about Thirty-first Street, and then connecting with Normanstone Drive, which lies northerly of Massachusetts Avenue.

This link would make one of the most attractive parks and drives in the District, connecting lower Rock Creek Park and Potomac Park by a beautiful driveway and park entirely around the Zoological Park to north Rock Creek Park. It is possible that traffic will be so great some day that there will be objection to its passing through Zoological Park, which lies between the lower Rock Creek Valley, as now being acquired, and Rock Creek Park. This link would make a continuous park drive from the extreme end of lower Potomac Park to the northern end of the District.

3. *Fort Hamilton*, situated on the Bladensburg Road and the Eastern Branch. This is a beautiful elevation, covered with magnificent trees, and situated in a part of the District not now well supplied with parks. There are few places in the District more suitable for a magnificent park than this site.

4. *Patterson Park.*—This has been recommended by the commissioners, and is much favored by many of our citizens. There would seem to me, however, to be some objection to this, and it is my belief that those who are strongly in favor of this park might be converted to the Fort Hamilton site, provided it is enlarged so as to extend

southerly to Bladensburg Road and Benning Road. This (Fort Hamilton), I feel, could be made a wonderful park, and should satisfy the requirements of the northeast section, as it would be accessible by way of Maryland Avenue, one of the great avenues of the city, and leading from the Capitol to Anacostia River Park. Especially would this be desirable if the Botanical Gardens are to be situated in this part of the District, and there would seem to be some probability of this being done.

5. *Fort Drive* in two sections. (1) That running from Sixteenth Street by way of Fort Stevens, Fort Totten, and Fort Bunker Hill to Anacostia River Park, and (2) connecting Fort Davis by way of Good Hope to Fort Stanton. These would be two important links in the Fort Drive plan to preserve the old civil war forts which were constructed for the defense of Washington, and the project to construct a fort drive encircling the city.

6. *The Dean tract* at Florida Avenue and Connecticut Avenue northwest.

This needs little comment from me. It is located in one of the most thickly populated sections of the District, surrounded by many very large apartments, housing thousands of people who have small open-air space for children.

This would supply a great need as a breathing space and playground.

It is believed that this can be bought at a reasonable price, but if delayed will likely be improved and destroyed for a park.

7. *Fort Reno Park.*—A separate report will be made respecting this.

SURVEYOR'S BOND.

I wish to invite your attention to the bond of the surveyor, as required by sections 1578 and 1597 of the Code of Law for the District of Columbia.

The law requires the surveyor to furnish a $20,000 bond for the faithful discharge of the duties of his office, and to cover errors or neglect in connection with surveys, etc.

The only bond possible to secure is one that involves the entire property of the surveyor. There is no other head of a department in the engineer department of the District, so far as I am advised, who is required to give a similar bond, and there would seem to be no more reason why, as acting agent for the District, the surveyor should have to carry such a bond than any other engineer. However, it would seem proper if the surveyor could get a bond covering the handling of funds, but not for the execution of work. This liability is particularly dangerous at this time on account of frequent changes in the personnel of the office, at times the help being very inferior on account of the small salaries offered.

It is hoped that the commissioners will make some effort to have the law regarding the surveyor's bond remedied, and submit to Congress a law calling for a bond to cover the amount of fees received and handled by the surveyor.

SALARIES.

I wish to emphasize the absolute necessity for an increase in the salaries of the employees of this office. About half of the force of this office is paid less than $1,000 per annum each. It is not believed that there is another office in the District service or the Federal Government with such a percentage of low salaries, while the scale of salaries should run higher here than is paid in the course of ordinary government employment, as the work is of an extremely technical character, and requires employees qualified by a special course of education. This, of course, makes it impossible to secure the class of assistance the office should have. The recommendations submitted in our annual estimates are those adopted by the executive committee appointed by the general committee composed of all the heads of the District government. It is neeedless to say that wages everywhere in all classes of work have increased, as the cost of the necessities of life, including house rent, clothes, fuel, etc., in fact, everything one has to obtain for a living, have enormously increased, and yet statutory employees' salaries remain the same with the exception of the small bonus. It is difficult to understand how many of the statutory employees are able to provide the necessities of life for themselves and their families on the meager salaries they receive.

Very respectfully,

M. C. HAZEN, *Surveyor.*

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS.

WASHINGTON, *August 18, 1920.*

SIR: I have the honor to submit my fourth annual report dealing with the operations of the trees and parkings office for the fiscal year ended June 30, 1920.

TREES PLANTED, REMOVED, AND SPRAYED.

Two thousand five hundred and ninety-six young trees were planted to their permanent position on the streets during the fiscal year, a net increase of 1,838 over the number planted the previous year. A number of the trees planted were for the purpose of filling vacancies in existing rows, but the large majority were used in extending the lines into the suburbs and hitherto unplanted localities. Of the number planted 2,591 were set at the curb line, 2 in the parking between the inner edge of the sidewalk and the building line, 1 in the central parking of Fourteenth Street NW, north of Montague Street; and 2 in the Langdon School yard. The work of preparing tree spaces for planting is vigorously prosecuted through such portions of the year as it is found practicable to so distribute the force. As a rule, however, no holes are dug between May 1 and August 1, the men being employed in cultivating young trees, mowing weeds, etc.

Hundreds of trees die annually because of injuries over which this department has no control, but has to bear the blame. In addi-

tion to natural enemies, the unfavorable city conditions make the life of a street tree a hard one, and it seems idle to plant trees unless their safety can be assured. The chief sources of injury to shade trees are the generally poor conditions of the soil along the streets, which is continually being improverished by the growing tree and our inability to fertilize them because of the cement walks and pavements. Salt water which is used in the making of ice cream is responsible for the death of a great many trees. During the year 1,654 trees were removed for various reasons.

Street trees, like all other forms of vegetation, are subject to attack of insects and diseases. Because of the unfavorable conditions under which they grow, spraying for biting and sucking insects and suitable treatment for borers or other burrowing insects require careful treatment.

The following statement shows the number and varieties of trees planted, removed, and sprayed during the year:

Variety.	Planted.	Removed.	Sprayed.
Ailanthus		1	
Arbor vitae		2	
Ash		2	
Catalpa		24	
Cedar		2	
Cherry, wild		1	
Chestnut		6	
Chestnut, horse		3	212
Elm	322	43	11,735
Gingko	32	10	
Gum, sweet		1	67
Hickory		1	
Linden	136	77	3,515
Locust:			
Honey		9	
Yellow		40	
Maple:			
Norway	876	305	4,192
Red		9	30
Silver		375	5,651
Sugar	272	154	900
Sycamore		19	
Mulberry		4	
Negundo		5	
Oak:			
Chestnut		2	
Pin	434	42	2,017
Red	230	112	289
White		6	
Black		1	
Pyramidal		4	
Willow leaf		7	
Peach		1	
Pine		1	
Poplar:			
Aspen		20	
Athenian		7	
Carolina		137	
Balsam		1	
Lombardy		1	
Tulip		16	697
Sycamore, i. e., Oriental Plane	294	202	3,800
Walnut, English		1	
Total	2,596	1,654	33,105

The planting, removal, and spraying of the above trees was paid for as designated below:

	Streets, District of Columbia, 1920, Parking Commission.	Appropriations for other departments.	Whole cost deposits.
Planting	2,571	22	3
Removing	1,528	117	9
Spraying	33,105	.....	.....

The total number of trees sprayed, as shown in the table, was for the extermination of the elm-leaf beetle, tussock moth, and the fall web worm. These trees were sprayed with arsenate of lead. In addition to the above work performed for the destruction of insects, this office found it necessary to spray 1,431 trees with whale-oil soap and nicotine sulphate for the destruction of aphis or plant lice; also used the hot-blast torch for the destruction of the sycamore louse on 579 trees, and applied lime-sulphur wash on 2,159 trees for the forbes scale.

Of the 1,654 trees removed during the year, 101 were decayed and dangerous; 100 were of inferior and condemned varieties; 7 to relieve excessive shade; 169 because of street improvements; 7 for driveways; 12, improvements to alleys; 36 by accidents; 97, storms; 2, injurious to private property; 16, close proximity to buildings; 1, to accommodate lamps; 2, entrances to buildings; 7, interference with building operations; 16, interference with curb trees; and 1, parking improvements. It was ascertained that 28 trees were destroyed by illuminating gas, 40 by salt water, 48 by abnormal moisture supply, 12 by being filled around, 32 by being girdled, 6 by drought, 22 by insects, scale, borers, sycamore louse, etc., 12 by root mutilation, 2 by frost, 4 by being overshadowed, 3 by horse bite, and the deaths of 871 were unexplained.

Of the number removed, 1,446 stood at the curb line, 4 in school grounds, 128 in the parkings, 63 in the sidewalk, 7 in the roadways, and 6 in alleys.

NURSERIES.

About all of the available ground in the nursery at Fort Dupont is now used, and in a few years we will be unable to grow the stock fast enough to keep up with the demands of the city. It is not deemed advisable to transplant trees in the nursery rows on the tract of ground on reservation No. 13, because the ground is to be used in the near future for the Gallinger Hospital. The frequent transfer of the nursery to different locations is a hardship, because many trees are lost, and it takes approximately five to seven years before trees can be transferred to the streets after they have been set out in nursery rows. The past spring about 800 Norway maple seedlings were transferred from the seed beds to the nursery rows. The nursery is well stocked with young trees. A majority of these trees are small and not the proper size to transplant to their permanent position on the streets. The site we occupy is not large enough

to enable this department to grow the trees fast enough to extend the tree system, provided we are restricted to the use of only the cleared area. It is necessary to transfer some seedlings to the nursery rows each year in order to keep pace with the street extensions.

TRIMMING.

It has been impossible to undertake any systematic trimming of trees during the fiscal year owing to the scarcity of labor. Many individual requests for the trimming of trees throughout the city were given attention. This class of work kept a foreman with a gang of men employed almost continuously throughout the year. The sycamore trees on Eleventh Street NW., between B Street and Florida Avenue, were in very bad shape and they were severely trimmed, i. e., topped off last winter. These trees have put out a good growth the past spring, and in a couple of years this street will present a fine appearance. A majority of the trees on public space are in need of trimming, and it is hoped that this work can be undertaken in the near future. A total of 4,009 trees were trimmed during the year.

TREE SURGERY.

Cavities are caused by any neglected injury to a tree in which the bark is removed, allowing the wood to rot and decay toward the center of the tree. The most frequent injuries are the result of gnawing by horses, neglect in treating wounds, and removing stubs in pruning; also failure to remove and treat dead branches or those broken by storms. Treatment of cavities is ineffective unless all diseased wood is completely removed. The cavities in 271 trees were treated. The following shows the location, kind, and number of trees cemented:

Kind.	Curb.	Parking.
Elm	2	
Linden	247	5
Maple:		
Norway	4	
Silver	6	
Oak, white		1
Sycamore	6	
Total	265	6

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES.

At the beginning of the fiscal year all small trees had not received their usual spring cultivation, and this work was continued until they had been given attention. This work was resumed the past spring, and at the close of the year nearly all the young trees had been cultivated.

The work of mowing the weeds on parkings abutting unimproved property was in progress at the beginning of the fiscal year. This work was performed at the same time that the young trees were

cultivated. A very small amount of mowing has been undertaken the past spring.

A total of 1,134 wooden tree boxes were removed during the year from trees which no longer required their protection.

PAVING OF ABANDONED TREE SPACES.

The work of paving abandoned tree spaces throughout the city during the year was performed by the surface division, engineer department, and the cost of the work paid from the appropriation for the parking commission. A total of $613.56 was spent on this work.

REGULATION OF TERRACES.

In addition to the inspections in cases pertaining to trees, this office examined and issued 674 permits affecting the grade of terraces in connection with building operations during the year. The regulation of the parkings is proceeding satisfactorily.

Summary.

Curb trees on streets at close of fiscal year 1919	104,254
Net increase of curb trees during fiscal year 1920	1,145
Curb trees on streets at close of fiscal year 1920	105,399

Appropriations.

By appropriation "Streets, District of Columbia, 1920, parking commission"	$60,000.00
By repayment to above appropriation	2,466.08
Total	62,466.08
Labor	40,769.38
Hired teams	3,251.50
Materials	16,170.54
Charges against appropriation for labor and materials furnished in connection with work performed by other departments	2,100.94
To balance of above appropriation, unexpended	173.72
Total	62,466.08
Expenditures from miscellaneous appropriations, exclusive of parking commission	2,466.08

In conclusion, I wish to call attention to the fact that the shade trees of Washington are undoubtedly one of the crowning glories of this city. The appropriations for tree planting have never been adequate, and it would seem that unless increased appropriations are obtained the extension of the tree planting will have to be discontinued and an attempt made to only maintain the existing trees. The majority of the trees on the streets need trimming. The first cost of planting trees is very small compared with the assessments for street improvements. The cost of properly planting trees is a very small percentage of the cost of the proper improvement of the street. The use of the street will cause it to deteriorate and need repairs, while if the trees are properly cared for they will thrive and grow,

and the first cost will be insignificant when compared with their increased value a few years later. Real estate men realize that trees increase the value of their property, and consequently in all land development in the District trees are the first thing they ask for after the streets are opened. It would seem that sufficient funds should be provided to not only maintain the fine rows of trees that line the streets throughout the city, but to extend these lines as rapidly as streets are made. The citizens of the District of Columbia know it is the duty of this office to plant trees on all streets where conditions justify, and to comply with these requests at the present time it is necessary to neglect some other branch of the work. The increase in wages for labor and supplies and the continual increase in the street extensions, with no increase in appropriation for this department, makes it impossible to keep pace with the growth of the city unless sufficient funds are made available.

Very respectfully,

C. LANHAM,
Superintendent of Trees and Parkings.

ASSISTANT TO THE ENGINEER COMMISSIONER, D. C.

REPORT OF THE SUPERINTENDENT OF THE MUNICIPAL GARAGE.

WASHINGTON, *August 5, 1920.*

Sir: I have the honor to submit the following report on the "Care and maintenance of automobiles in the municipal garage."

For the fiscal year ending June 30, 1920, this department maintained and kept in running condition 41 automobiles for the various departments of the District government.

For urgent and necessary transportation at all hours, this garage has necessarily kept open at all times, night and day, for the past fiscal year. All autos were washed, supplied with oil and gasoline by the night force, who also served as watchmen.

The labor and mechanic force consisted of eight men keeping the machines in repair, maintaining them, and driving for departments which did not have automobiles or drivers allotted to their respective departments.

In addition to the battery-charging outfit which was installed last year and proved a success, we have installed a steam vulcanizing outfit for all vulcanizing of inner tubes, which means a large saving on tire repairs.

The total running expense on these cars for gas, oil, tires, miscellaneous supplies and labor amounted to $19,721.41, or an average of $481.01 for each car, or $0.077 per mile.

Repair parts amounted to $2,586.80, or an average of $66.09, for each car, or $0.0129 per mile.

Average mileage for each car was 6,244 miles.

A. E. REIGELMAN,
Superintendent Municipal Garage.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE ASSISTANT ENGINEER COMMISSIONER.

WASHINGTON, *October 6, 1920.*

SIR: I have the honor to transmit herewith annual reports giving in detail the operations during the fiscal year ended June 30, 1920, of the various divisions and offices under my supervision.

Very respectfully,

CAREY H. BROWN,
Major, Engineers, United States Army,
Assistant to the Engineer Commissioner.

To the ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT.

WASHINGTON, *September 14, 1920.*

SIR: The annual report of the water department for the fiscal year ended June 30, 1920, is herewith submitted:

I again invite attention to the fact that Congress in appropriating for the maintenance of the Washington aqueduct has authorized the expenditure, from July 1, 1916, to and including June 30, 1920, of $711,585. To this sum, for the fiscal year ending June 30, 1921, the additional sum of $240,000 has been appropriated, making a total of $951,585.

This brings to my mind forcibly that an effort should be made to have Congress authorize the payment for water used by both the United States and District governments, as the department needs all of its funds for maintenance and extensions. I have asked in my estimates that the maintenance of the aqueduct and filtration plant for the fiscal year ending June 30, 1922, be provided for between the District and United States government funds and not from the water department's funds.

The relative amounts invested in the construction of the water supply and distribution system of the District of Columbia up to and including June 30, 1920, are as follows:

United States Government	$7,561,009.10
District government	3,601,264.30
Water department	9,550,431.96
Total	20,712,705.36

I invite particular attention to the fact that the mean daily consumption for the year was 62,929,027 gallons, while for the year ended June 30, 1919, it was 64,428,356 gallons, showing a decrease of 1,499,329 gallons per day for this year, making a per capita consumption of 143.8 gallons.

Water pumped.	Fiscal year 1919-20.	Fiscal year 1918-19.
SERVICE.	*Gallons.*	*Gallons.*
First high (city)	7,230,714,990	7,139,192,000
Second high (city)	3,371,310,990	3,195,886,990
Third high (city)	1,021,189,280	912,226,400
Fourth high (city)	87,006,600	98,682,115
First and second high (Anacostia)	139,999,700	130,279,960

The total length of mains laid for this fiscal year is 31,288 feet, or 5.9 miles, making the length of mains in service 639 miles.

Total number of meters in use June 30, 1920, 61,365. Percentage of metered services, 85. Very few meters were installed during the year owing to high cost and lack of funds.

I would suggest that action be taken at an early date to dispose of the valuable real estate and improvements in square No. 175, bounded by Sixteenth, Seventeenth, U, and V Streets NW. This property represents an investment of $66,500 of water department funds, and is no longer used or needed by the water department. The sum realized from the sale of this property could be utilized to advantage in making needed extensions of the distribution system.

Attention is invited to the reports of the several divisions of this department showing the work in detail.

I wish to record my appreciation of the work done by the employees of this department.

J. S. GARLAND,
Superintendent Water Department.

ASSISTANT TO THE ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION.

SIR: I respectfully submit the following report of work done by division D, engineering, construction, plans, estimates, tests, telephone switchboard, and records for the fiscal year ended June 30, 1920.

The laying of a 16-inch water main in South Dakota Avenue from Vista Street to Bladensburg Road NE. was completed and put in service. This main will eventually be a connecting link between proposed larger-sized mains to be laid in Bladensburg Road and Rhode Island Avenue, and also allowed the removal of the 12-inch main and the footbridge over the Baltimore & Ohio Railroad tracks at Twenty-eighth Street.

A 12-inch water main was laid in K Street from Twenty-ninth Street to Wisconsin Avenue NW., which will give to that vicinity better service and fire protection, as formerly only 4-inch and 6-inch mains supplied this territory. The smaller mains were abandoned after the 12-inch main was placed in service.

At eight different locations this department has repaired breaks on the United States Government 36-inch main in First Street SE., south of I Street, on request from the superintendent in charge.

A 12-inch water main was laid in Longfellow Street from Georgia Avenue to Thirteenth Street, and in Thirteenth Street from Longfellow Street to just south of Kennedy Street NW. This main is a portion of the proposed 12-inch mains to be laid in this vicinity which will be supplied by the proposed extension of the 20-inch main in Illinois Avenue, north from Grant Circle.

Work is now in progress on repairing the cement cover over the Reno Reservoir. This work has been delayed considerably by inability to obtain the necessary amount of cement.

(For detailed report see reports of Messrs. Fitzgerald, Beckett, Lay, Woodward, Yates, and chief telephone operator at the District pumping station.)

D. W. HOLTON, *Engineer.*

The SUPERINTENDENT OF THE WATER DEPARTMENT.

SIR: I respectfully report that the following work was completed during the fiscal year beginning July 1, 1919, and ending June 30, 1920:

Number of mains laid:	
16-inch	1
12-inch	15
8-inch	69
6-inch	1
1½-inch	1
Total	87

Laid new mains in place of old:

Job No. 6154, 6-inch (substitute for 6-inch), W Street east from Sixteenth Street NW., south side.

Job No. 6137, 12-inch (substitute for 4-inch and 6-inch), K Street between Twenty-ninth Street and Wisconsin Avenue NW.

Mains lowered:

Job No. 6152, 6-inch, Thirty-ninth Street north from Alton Place NW.

Job No. 6138, 4-inch, in alley west of Wisconsin Avenue and south of Grace Street NW.

Job 6193, 8-inch, in Allison Street between Iowa Avenue and Thirteenth Street NW.

Job No. 6148, 8-inch, in Franklin Street between Thirtieth Street and South Dakota Avenue NE.

Job 6206, 8-inch, in Sigsbee Place west from Twelfth Street NE.

Valves installed:

12-inch, 2-way	12	6-inch, 4-stem	5
8-inch, 2-way	84	6-inch, 4-stem, 8-inch bells	14
6-inch, 2-way	28	6-inch, 3-stem	7
4-inch, 2-way	52	6-inch, 3-stem, 8-inch bells	3
3-inch, 2-way	13		
2-inch, wheel	3	Total	223
1½-inch, wheel	2		

Valves removed and abandoned:

12-inch, 2-way	6	6-inch, 4-stem, 8-inch bells	2
8-inch, 2-way	9	6-inch, 3-stem	2
6-inch, 2-way	14	6-inch, s-stem, 4-way	7
4-inch, 2-way	29	6-inch, s-stem, 3-way	3
3-inch, 2-way	1	6-inch, 2-stem, 4-way	2
2-inch, wheel	3		
1½-inch, wheel	2	Total	84
6-inch, 4-stem	4		

Valve casings—	
Installed	197
Removed	56
Adjusted to grade	21
Buffalo boxes—	
Installed	3
Removed	7
Adjusted to grade	1
Fire hydrants erected—	
New locations	41
New in place of old	18
Fire hydrants—	
Adjusted to line and grade	29
Removed	20
Public hydrants erected	1
Wells filled and abandoned	1

nnections to private premises, etc.—

3-inch	12
4-inch	8
6 inch	2
Total	22

MISCELLANEOUS.

Job No. 6017. Replaced the 12-inch main in Vista Street between Franklin eet and South Dakota Avenue NE.
Job No. 6072. Offset the 12-inch main for sewer construction at Thirty-third l K Streets NW.
Job No. 312. Removed 6-inch four-way valve at Fourth and G Streets SE.
Job No. 6167. Rearranged mains at intersection of Fourteenth and B Streets .
Job No. 6217. Changed location of the 6-inch main in Twelfth Street between Street and Pennsylvania Avenue SE. for sewer construction.
Job No. 6252. Removed No. 3 pump at Bryant Street pumping station.
Job No. 6195. Removed horse fountain from southeast corner of Pennsylvania enue and Eleventh Street SE. to the northwest corner of Twelfth Street and nsylvania Avenue SE.
Job No. 6252. Laid 4-inch drain in basement under boiler room of Bryant eet pumping station.
Job No. 6252. Installed two hot wells in engine room of Bryant Street pump- station.
Job No. 204. Removed 6 by 3 inch tee and 3-inch valve from abandoned vice to St. Paul's Church in Twenty-third Street between I Street and shington Circle NW.
Job No. 319. Repaired 10-inch main and rearranged mains at Seventh and Streets NW.
Job No. 6203. Changed location of low-pressure fire hydrant in the east side Fourteenth Street between K and L Streets NW.
Job No. 6026. Filled lake in rear of the Bryant Street pumping station.
Job No. 6286. Removed horse fountain and public hydrant at Fourteenth and ridian Streets NW.
Job No. 6286. Installed horse fountain at Fourteenth and Delafield Streets l Iowa Avenue NW.
Job No. 6185. Removed 12-inch main and bridge over the Baltimore & Ohio lroad tracks at Twenty-eighth and Franklin Streets NE.
Job No. 304. Installed 4-inch blow-off on the 6-inch main in the east side of nnecticut Avenue south of S Street NW.
Job No. 6295. Removed mortar finish from the concrete cover over Reno servoir.
Job No. 319. Repaired 3-inch blow-off on the 48-inch main at New Hampshire enue and M Street NW.
Job No. 6310. Laid 1½-inch service pipe and erected public hydrant in E eet between Thirty-third Street and Anacostia Road SE.
Job No. 319. Repaired broken 12-inch main on the Benning Bridge NE.
Job No. 6072. Replaced the 12-inch main in Water Street between Thirty- rth and Thirty-sixth Streets NW.
Job No. 6109. Removed 8 by 6 inch tee and 6-inch valve at Twelfth and ater Streets SW.
Job No. 3654. Made eight repairs to the 36-inch United States Government ain in First Street between I and O Streets SE.

JOHN E. FITZGERALD,
Foreman.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

MISCELLANEOUS ENGINEERING.

SIR: I report that the following work was done for the fiscal year eginning July 1, 1919, and ending June 30, 1920:

urveys and levels
obs staked
reliminary levels

Visits to work in progress	549
Fire-hydrant pressures taken	383
Fire-hydrant elevations established	60
Completed notes turned in	136
Resurveys made	6
Investigations made	5
Pressure-gauge charts collected	92
Old mains and valves located	8
Street intersections located	3

Established line for new pump in the Bryant Street Pumping Station.

Measurements were taken and elevations established for making plans for a proposed connection between the second and third high services in vault at the pumping station, and at Second and Bryant Streets NW.

A. S. LAY, *Assistant Engineer.*

PLANS, ESTIMATES, AND MISCELLANEOUS DRAFTING.

SIR: I submit herewith the report of work done under my charge during the fiscal year ended June 30, 1920, as embodied in the report of Mr. H. M. Dante, in charge of subdivision "Plans, estimates, and miscellaneous drafting."

H. BECKETT, *Assistant Engineer.*

The SUPERINTENDENT OF THE WATER DEPARTMENT.

MISCELLANEOUS DRAFTING.

Drawings and tracings made	79
Projects made	122
Engineers' notes posted on 50, 100, and 300 foot scale maps and tracings	588
Intersection cards made	103
Valve notes posted on intersection cards	254
Files forwarded to assessor	122
Cards forwarded to assessor	142
Connection cards for registrar	26
Communications, reports, etc., written	1,415
Permits passed	1,214
Locations of water mains given out	2,000
Water pressures given out	208

Posted, daily, 50, 100, and 300 foot scale water main maps, and map tracings; posted, daily, the work in progress; worked on cards showing mains, valves, etc., at street intersections; worked on valve index; passed schedules of work to be done under the commissioners' orders; passed schedules of work to be done by the surface division; passed permits for terraces, copings, and driveways; miscellaneous lettering, estimates, reports, and general office work.

H. M. DANTE, *Clerk in Charge.*

The ASSISTANT ENGINEER, WATER DEPARTMENT.

CARE AND MAINTENANCE OF VALVES, ETC.

SIR: The following report of division D, care and maintenance of valves, care of reservoirs and tanks, miscellaneous plumbing, inspection and repairs to fire hydrants, street hydrants, pumps, and

fountains, and repairs to leaks for the fiscal year ended June 30, 1920, is respectfully submitted herewith:

Valves operated	9,130
Valves packed	186
Valves fitted with new key nuts	7
Valves examined for condition	5
Valves examined for repairs	2
Valves repaired	21
Valves inspected to check normal position	142
Valves capped	8
Valves examined for leakage	285
Valves from which gates were removed	1
Valves on which wheels were placed	2
Valves fitted with new brass stems in place of old:	
12-inch two-way	1
6-inch two-way	2
6-inch four-way	1
4-inch two-way	3
3-inch two-way	5
Valve casings cleaned	7
Valve casings uncovered	16
Valve casings examined for number plates	104
Valve casings in which number plates were installed	54
Valve casings examined for grade	190
Valve casings examined for condition	50
Valve casing covers installed in place of old	2
Air valves installed	1
Air valves installed in place of old	2
Air valves repaired	1
Blow-offs flushed	1,297
Intersections located	27
Fire hydrants examined	57,528
Fire hydrants repaired	724
Fire hydrants lubricated	8,221
Fire hydrants flushed	68
Fire hydrants erected in place of old	1
Fire hydrants cleared of weeds	20
Fire hydrants reversed	4
Fire hydrants on which air valves were placed	48
Fire hydrant pressures recorded	3
Dangerous holes back of fire hydrants repaired	32
Public hydrants erected	6
Public hydrants erected in place of old	11
Public hydrants examined	4,524
Public hydrants repaired	269
Public hydrants abandoned	6
Public hydrants removed	1
Public hydrants thawed out	110
Public hydrants adjusted	2
Public hydrants paved around	2
Horse fountains repaired	80
Horse fountains cleaned	6,952
Horse fountains erected	2
Horse fountains erected in place of old	2
Horse fountains abandoned	1
Horse fountains adjusted to grade	2
Horse fountains thawed out	15
Horse fountains in which float valves were cleaned	35
Combination fountains repaired	2
Combination fountains painted	2
Pumps examined	1,340
Pumps repaired	61
Pumps erected in place of old	1
Pumps abandoned	3
Pumps painted	20
Sanitary drinking fountains repaired	41

Sanitary drinking fountains cleaned
Sanitary drinking fountains reset
Sanitary drinking fountains adjusted
Traps cleaned 1
Traps repaired
Miscellaneous inspections made
Standpipes placed on blow-offs
Curb boxes installed in place of old
Times south basin, Brightwood Reservoir, was cleaned
Times south basin, Brightwood Reservoir, was sprayed
Times north basin, Brightwood Reservoir, was cleaned
Times north basin, Brightwood Reservoir, was sprayed
Complaints:
- Unpalatable water
- Low pressure
- Water hammer

Service pipes repaired
Service pipes laid
Service pipes changed from old to new mains
Drain pipes repaired
Drain pipes cleaned
Drain pipes laid
Mains examined
Mains relaid
Fittings strapped to mains
Smith cuts made
Cut-offs made
Lead connections made
Lead connections repaired
Meters erected
Meters erected in place of old
Meters repaired
Meters removed
Springs cleaned
Wells cleaned
Fire alarms answered
Bleeders repaired
Bleeders examined
Times services were changed temporarily
Tests made to determine pressure

REPORT OF LEAK MEN'S WORK, DIVISION D.

Broken mains repaired (3-inch to 12-inch)
Joints repaired (16-inch and larger)
Joints repaired (3-inch to 12-inch)
Service pipes found closed
Service pipes cut and plugged
Service pipes plugged
Service pipes abandoned
Service pipes reported frozen
Service pipes cut off for tests
Service pipes reported leaking and cut off at main
Service pipes reported leaking and cut off at meter
Service pipes reported leaking and cut off at box
Service pipes reported leaking and cut off inside house
Meters reported leaking
Meters reported leaking, referred to the water registrar
Meters reported choked
Premises where supply was turned on by request
Sewers reported leaking, referred to the health department
Sewers reported leaking, referred to the sewer department
Obstructed sewers, referred to the health department
Obstructed sewers reported
Small leaks found in charge of plumber
Leaks referred to the water registrar

Leaks reported and found to be wrong number	30
Reported leaks found to be false	192
Reported leaks and could get no response from occupants	46
Twenty-four-hour notices served	12
Forty-eight-hour notices served	8
Mains plugged	3
Valves reported leaking	31
Valves reported broken	1
Fire hydrants reported leaking	14
Fire hydrants reported broken	5
Public hydrants reported leaking	3
Public hydrants reported broken	1
Air valves reported leaking	1
Street washers reported leaking	5
Boilers reported leaking	1
Sanitary drinking fountains reported leaking	1

W. R. WOODWARD,
Chief Inspector of Valves.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

TELEPHONE SERVICE.

SIR: I respectfully submit the following report of work done by the telephone operators at the water department switchboard during the year ending June 30, 1920.

A brief summary of the chief items of work done during the year is as follows:

Recorded—	
Leaks	4,568
Fire hydrants out of service	609
Fire hydrants in service	541
Cut-offs by water survey division	418
Fire alarms	1,246
Reservoir elevations	2,190
Gate house elevations	306
Engine counters, Anacostia	1,460
Engine counters, Reno	1,095
New jobs	884
No-water complaints	178
Low-pressure complaints	75
Turn-on service	487
Issued work orders for the repair of fire hydrants, etc	1,224
Issued morning reports of the various job locations	3,481
Telephone connections	367,860

All records of leaks and movements of the leak men are kept by the telephone operators at the switchboard.

The daily morning report of the various job locations, construction, and repair gangs is compiled and typewritten by the chief telephone operator.

All records of broken valve covers, dangerous holes, etc., are handled by the telephone operators through the storeroom and stable; on Sundays and holidays this work is assigned to the leak men for disposition.

New fire hydrants erected and fire hydrants in place of old are recorded by the telephone operators, and all information pertaining to same is transmitted to Chief Wagner's offices, District of Columbia fire department, by the chief telephone operator.

Reports from various foremen relative to underground exposure of properties of the public service corporations during the year were

reported to the Public Utilities Commission by the chief telephone operator.

HENRY F. LUCE,
Chief Telephone Operator.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

STEAM ENGINEERING AND SHOPS.

SIR: I have the honor to submit the following report of the operations of the subdivisions of steam engineering and shops of the water department for the fiscal year ended June 30, 1920. Mr. James T. Fink, my predecessor, was in charge of these operations up to August 15, 1919.

The following is a summary of the work done at the district pumping station for the year:

Water pumped, figured from plunger displacement:		
First high service	gallons	7,230,714,990
Second high service	do	3,371,310,990
Third high service	do	1,021,189,280.
Total	do	11,623,215,260
Fourth high service	do	87,006,600
Coal burned	tons	7,494
Cylinder oil used	gallons	944
Engine oil used	do	1,830
Filtered oil used	do	1,110
Turbine oil used	do	298
Grease used	pounds	500
Waste used	do	811

The regular force employed for the operation of the pumping engines, boilers and auxiliaries, cleaning of machinery, etc., was as follows:

	Steam engineers.	Assistant steam engineers.	Firemen.	Oilers.	Cleaners.	Laborers.
Sunday	4	3	3	4	4	0
Week days	4	3	3	4	4	4

For the fourth high service, the water is pumped from the Reno Reservoir—which is supplied by the third high service pumps—to an elevated tank by gasoline engines and triplex pumps. This machinery is operated daily by the watchman in charge of the reservoir, and two assistants on night duty. The water pump for this service during the year was 87,006,600 gallons, or a mean of 238,374 gallons daily.

The Anacostia pumping station has been operated without interruption during the year, pumping to the three towers supplying the area east of the Anacostia River. This station is taken care of by four men. The water pumped for this service during the year was 139,999,700 gallons, or a mean of 383,560 gallons daily.

The total pumpage for the year at the District pumping station was 369,860,380 gallons more than in 1918–19. The greatest amount pumped in one day (Aug. 14) was 40,077,210 gallons; least in one day (June 20) was 28,442,360, and the average dynamic head against

pumps was 113.6 feet. The total operating expenses (excluding overhead) chargeable to pumping was $107,326.98, as against $94,527.77 in 1918–19, making the total operative cost (excluding overhead) of pumping 1,000,000 gallons of water into the mains, $10.83. This is $2.43 per million gallons more than in 1918–19, and is entirely due to the increased cost of labor and material. The average cost of coal per ton for the year was $7.06, which was 40 cents more than in 1918–19.

The station duty for the year was 67,783,555 foot-pounds per 100 pounds of coal. This is 13.1 per cent more than the duty obtained during the preceding year, and represents an annual saving of approximately 686 gross tons of coal. This saving in coal may be attributed partly to a greater proportionate amount of work performed by the high-duty pumping units, and partly to improved operating conditions.

Specially important work done at the District pumping station during the year includes the following: Replacement of our old Green fuel economizer with a new one, by the Baker-Dunbar Allen Co. of Philadelphia; a general overhauling of our coal handling machinery by the builders, the Meade-Morrison Co., of New York; building a by-pass flue connection between economizers Nos. 1 and 2, by G. W. Forsberg; running final acceptance tests on the 5,000,000-gallon De Laval pumping unit installed 1917; removal of engine No. 3 from old foundations, and the erection of a 15,000,000-gallon De Laval pumping unit in place of same by the builders, on new foundations built by the water department; standardizing our grate bars for the Crowe stokers, and running the official duty tests on the new 15,000,000-gallon pumping unit.

REPAIR SHOPS.

The work accomplished during the year in the repair shops includes the following: Made all necessary repairs for machinery at the District pumping station, Reno and Anacostia stations; repairs to 35 automobiles and trucks of the water department, and 31 autos for other departments of the District of Columbia; repairs to all water meters used in the District of Columbia. Also made practically all repair parts for fire plugs, valves, street hydrants, etc., including all tools used on the work of laying water mains, etc., such as picks, chisels, breakers, calking tools, yarning irons, valve keys, pipe-band eyebolts, arch irons, and miscellaneous tools and appliances as required for the various work.

Details of the work follow in part: Put new joints in steam connections on No. 4 engine; repaired waste-cleaning machine; made valve springs for pumps; ran pipe for heating system in meter repair shops; put in 15 new boiler tubes; made repairs to coal crusher; repaired boiler and pipe in west garage; made repairs to and changed piping on Holley return system; repaired boiler furnaces and water softener; removed old No. 3 engine from foundations; repaired piping on boiler feed-water line; made new lathe centers and jigs for shop work; made Venturi meter connections for new economizer; supervised erection of new economizer; changed spuds on 300 water

meters; made brass castings for electrical department, fire department, street-cleaning department, sewer department, District of Columbia repair shop, etc.; made aluminum signs for electrical department; repaired and tested 5,572 water meters and 429 valves; built and tested 130 valves and 34 street hydrants.

BRASS FOUNDRY.

During the year all composition metal castings used for valve work, repair parts, etc., were made in our foundry. There were made in the foundry 8,204 pounds of brass castings, small and medium size, such as would be made in a general jobbing shop. The showing of the foundry for the year has been very satisfactory, and the repair work at this station has been much expedited by the casting of repair parts when needed for emergency. Attention is invited to the annual report of the foundry.

BLACKSMITHING.

The blacksmiths have forged bolts for engines; made S hooks for fire plugs; repaired tools; made pipe bands, feather wedges, T bolts, irons for coal-crusher hopper, new diamond-point chisels, lifting chisels, flogging chisels, and flat chisels; made pipe hangers for bridge at Langdon; sharpened 2,113 chisels, 4,704 picks, 187 steel bars; made 89 frost pins; repaired stakes; dressed calking sets; and welded new ends on picks.

CARPENTRY.

Repaired field boxes for water-survey division; repaired bodies of automobiles; made doors for stable, shed, and garage; remodeled stable for meter repair shop; sharpened saws for storekeeper; repaired tool wagon; made file rack for water-survey division; made forms for concrete covers; repaired doors and locks in station; made screens for Anacostia station; repaired floor in greenhouse; repaired patterns for valves; built forms for concrete work at Reno; inspected buildings at Anacostia, Reno, and Brightwood; made two hundred and twenty-six 8-inch concrete rings; eighty-one 4-inch concrete rings, one hundred and fifty-three 8-inch sectional rings, fifty-four 12-inch cylinders, etc.

PAINTING.

The painters have painted office rooms at station; painted walls, ceilings, and woodwork of new meter-repair shop; repaired cushions for automobiles; painted pitometer field boxes; covered drum heads on Nos. 7 and 8 boilers; repaired asbestos covering on boilers and steam mains; painted woodwork of stable; painted street hydrants; lettered new auto trucks; covered tops of automobiles; painted tool wagons; glazed and painted storm sash at Reno; stained and finished cabinet for water-survey division; cleaned and painted window frames and woodwork in District pumping station; painted ventilator at Reno tower; stained and varnished counter in office at District Building; painted gutters and down spouts on stable and blacksmith shop.

ELECTRICAL WORK.

The electrician and helper have taken care of generators, switchboards, motors, lights, etc.; operated coal conveyer, economizer, and crane; tested and recharged storage batteries; repaired electric fans; cleaned ejector in coal-crusher vault; repaired lights in engine and boiler rooms; adjusted monarch stops on engines; adjusted blueprinting machine; made repairs to coal conveyer; repaired circuit breakers on main switchboard; ran wires for operating the motor on new No. 3 pump; installed water-level gauge at Reno; and made repairs to shop engine.

CARE OF STATION.

The janitor's force has taken care of all cleaning throughout the building; removed shavings from the woodworking shop; attended to window cleaning; removed turnings, scrap, and other material from machine shop; furnished messenger service to the office, etc.

I wish to record herewith my appreciation of the services rendered by Messrs. I. C. Barber and A. E. Gibbons, my assistants, in the way of supervising the shopwork done at this station.

Respectfully submitted.

H. D. YATES,
Master Mechanic.

To SUPERINTENDENT WATER DEPARTMENT.

WATER SURVEYS.

SIR: The routine surveys covered the Capitol Hill section of the first high service, the business section of the gravity service, and the Petworth section of the Reno service. Miscellaneous inspection work was conducted in the eastern portion of the gravity service and special tests and examinations made at the various other points. The results of the routine and miscellaneous work are fully covered in the tabulated statements appended. Interesting conclusions may properly be drawn directly from the figures submitted, and, by comparison with parallel figures of previous years. For instance, on statement No. 1 it is noted that 165 individual leaks were found and that the average waste per day per leak was 6,660 gallons. Last year results were approximately the same, but it will be noted that this latter figure is higher than at any time since 1911. This surely indicates that during the long interval which lapsed between the surveys in the section where last year's leakage was found, the leaks have had opportunity to occur and increase to a size not possible when the territory was covered more frequently. Connecting this fact with the knowledge that the leaks found last year were all new leaks and considering the lapse of time since the last survey of this territory, together with the mileage of mains tested, it is apparent that 1,500,000 gallons daily may fairly represent the total new leakage which each year will add to the city's consumption. With preventive measures upon the present scale it is also apparent that the leakage will continue to increase.

It is a recognized fact that leaks increase rapidly in size and that this increase is not directly proportionate to the lapse of time but rather to an increasing geometric ratio. It is therefore evident that the leakage found and prevented affects the ultimate total consumption not directly in proportion to the quantity but rather to an extent which includes the total to which these leaks would amount if neglected. These conclusions are verified to some extent by the fact shown on statements Nos. 2 and 4 that a higher percentage of houses was found with defective fixtures this year than the year previous. As an economic proposition it would appear from the above to be wise to so apportion the waste prevention forces to the local conditions as to balance the increasing leakage and permit the reestablishment of discontinued investigations which have demonstrated their ability to radically reduce the prevailing wasteful consumption. The greatest quantities of leakage were found on iron and lead services and in the caulked lead joints. The latter cause leads in the matter of total quantity, but while the largest leak found during the year was a caulked joint wasting at the rate of 131,800 gallons per day, the broken lead services, ranking third as to total quantity of leakage, lead all other sources as a class by a substantial margin in the matter of discharge per leak. The average waste per leak from the lead services was over 16,000 gallons daily, from the caulked joints approximately 12,000, and from the iron services 8,400 gallons per day.

The special investigations were very limited in extent, most of them being made in response to requests or specific orders. Manograph measurements were made on the 20-inch main supplying the Washington Navy Yard for the purpose of checking the accuracy of the large Venturi meter on that line. This meter was found to be under registering between 25 and 50 per cent of the flow through it. This division was requested to investigate the sources of water entering the railroad tunnel at Eighth and Virginia Avenues SE. and under the tracks in the vicinity of New Jersey and Virginia Avenues SE. In both cases water-main leaks were successfully located and repaired. In the case of the tunnel leak work was particularly difficult, because the water was flowing through an old abandoned sewer from a remote point. Repeated inspections and reports were submitted upon the waste of approximately 40,000 gallons per day in cellar draining apparatus at the Dunbar High School and it was gratifying to find upon the final inspection of this plant that this agitation had resulted in the repair of the apparatus. As a result of special investigation at the public-comfort station in Judiciary Square a heavy waste of water was located and reported for remedy. A test of the new 6-inch meter on the Seventeenth Street side of the State, War, and Navy Building showed a slippage of between 25 and 100 per cent. This trouble was reported to the authorities of the filtration plant who have jurisdiction over it.

The total underground leakage found and prevented was 1,098,912 gallons daily. The total is approximately the same as found last year with the same organization. The total cost—$27,584.83—this year represents a substantial reduction from last year's figure of $33,462.25.

The value of the water saved at 4 cents per hundred cubic feet represents an annual return of $21,392.15 or 77.5 per cent of the investment. Under the present condition where the use of water is curtailed by orders of the commissioners the value of the work is most clearly demonstrated.

The decreasing velocities in the various mains have made flow measurements difficult and it has been necessary during the year to conduct extensive experiments looking to the construction of improved Pitot tubes and recorders to successfully handle the low velocities. This division has been equipped for several years with apparatus which is superior to any other now on the market, but the extreme limits which the water surveys are being carried in this city demand a standard of equipment not yet needed elsewhere. Toward the solution of these problems a great deal of energy is being directed. Hundreds of experiments with new apparatus were made during the past year and important facts determined. The near future promises complete success in the measurement of small flows by the use of an improved form of recorder with a new type of Pitot tube lately developed by this division. Regarding the new Pitot tube it is of interest to record that it embodies the first radical advance in Pitot tube theory since the invention of that device in the eighteenth century. The cost of experimental work has been extremely small, due to the fact that it has been conducted by regular employees whose services are necessary for the construction and repair of field apparatus.

The accomplishments of this division during the year reflect great credit upon the employees. Their confidence in their ability, based on long experience in the work, may be classed as the most important single factor contributing to a successful year.

Very respectfully submitted.

PAUL LANHAM,
In Charge Water Survey.

SUPERINTENDENT, WATER DEPARTMENT, D. C.

STATEMENT No. 1.—*Underground leaks, 1907–1920.*

Year.	Number.	Quantity (gallons per day).	Average (gallons per day).
1907-8	271	5,604,[illegible]00	20,700
1908-9	832	9,560,[illegible]00	11,500
1909-10	532	6,3[illegible],900	12,000
1910-11	62[illegible]	6,921,[illegible]00	11,[illegible]00
1911-12	813	5,115,300	6,300
1912-13	651	4,195,[illegible]00	5,[illegible]00
1913-14	452	2,552,[illegible]00	5,[illegible]00
1914-15	385	1,828,[illegible]20	4,[illegible]00
1915-16	420	1,981,[illegible]00	4,700
1916-17	3[illegible]0	1,752,750	5,155
1917-18	178	[illegible]3[illegible],640	4,689
1918-19	1[illegible]0	1,1[illegible]0,510	6,4[illegible]7
1919-20	165	1,098,912	6,6[illegible]0
13 years	5,8[illegible]3	18,971,532	8,381

STATEMENT No. 2.—*Year's results, 1919–20.*

Service pipes inspected:	
Metered	26,480
Unmetered	6,129
Houses inspected, unmetered	5,256
Houses with defective fixtures	308
Number of notices served	63
Number of services cut off	18

UNDERGROUND LEAKAGE.

Class.	Number.	Gallons per day.
Abandoned services, taps, etc	2	32,500
Iron services	31	285,700
Lead services	17	278,700
Wiped joints	10	22,100
Services, metered	64	114,672
Couplings	7	21,840
Stopcocks	0	0
Joints on mains	27	321,600
Fire hydrants	2	11,000
Horse troughs	1	8,000
Valves	1	1,300
Total	165	1,098,912

BLUE PRINTS.

Blue prints made for division E	351
Blue prints made for division D	223

EXPENSES.

Operating, per diem labor and material	$24,863.73
New work, material	2,721.10
	27,584.83

STATEMENT No. 3.—*Sources and quantities of underground leakage, 1907–1920.*

Class.	1907–8	1908–9	1909–10
SERVICES.	*Gals. daily.*	*Gals. daily.*	*Gals. daily.*
Abandoned taps and services	.....	.....	35,300
Iron services	2,729,000	5,214,000	2,438,000
Lead services			1,291,900
Wiped joints	327,000		710,100
Couplings	.....		118,700
Stopcocks	.....		84,800
Unclassified	111,000	2,039,500	.....
Total gallons	3,167,000	7,253,500	4,908,800
MAINS.			
Joints on mains	1,039,900	1,345,600	1,034,200
Broken mains	1,200,000	117,000	332,000
Valves	23,500	62,000	89,100
Blow-offs	.....	737,000	.....
Fire hydrants	174,000	45,500	.....
Total gallons	2,437,400	2,307,100	1,455,300
Total miles	.....	.....	62
Average per mile	.....	.....	23,473
Grand total	5,604,400	9,560,600	6,364,100

STATEMENT No. 3.—*Sources and quantities of underground leakage, 1907–1920*—Continued.

Class.	1910–11	1911–12	1912–13	1913–14
SERVICES.	*Gals. daily.*	*Gals. daily.*	*Gals. daily.*	*Gals. daily.*
Abandoned taps and services	173,600	147,200	180,900	101,700
Iron services	1,508,900	2,329,800	1,988,800	924,000
Lead services	1,237,600	976,700	394,000	471,000
Wiped joints	666,700	438,100	282,300	237,000
Couplings	182,900	123,700	75,600	66,900
Stopcocks	43,300	53,500	32,900	16,900
Street washers	42,000	10,400	5,700	500
Public hydrants	84,200	50,200	21,000	12,000
Unclassified	97,600	103,800	15,000	56,500
Total gallons	4,036,800	4,230,400	2,996,200	1,886,500
MAINS.				
Joints on mains	2,502,500	746,300	902,300	596,800
Broken mains	15,900	7,000	103,300	62,200
Valves	110,900	27,100	13,200	6,800
Blow-offs	176,600	71,300	6,000	.....
Fire hydrants	19,200	3,500	115,000	500
Total gallons	2,885,100	855,200	1,199,800	666,300
Total miles	192	194	292	298
Average per mile	15,027	4,408	4,109	2,236
Grand total	6,921,900	5,115,600	4,196,000	2,552,800

Class.	1914–15	1915–16	1916–17	1917–18	1918–19	1919–20
SERVICES.	*Gals. daily.*	*Gals. daily.*	*Gals. daily.*	*Gals. daily.*	*Gals. daily.*	*Gals. daily.*
Abandoned taps and services	54,700	68,700	124,400	64,540	8,000	39,500
Iron services	831,950	44[illegible],440	75[illegible],600	2[illegible]8,700	325,[illegible]00	285,[illegible]00
Lead services	254,100	201,380	143,[illegible]00	44,000	147,000	278,[illegible]00
Wiped joints	213,500	342,480	128,8[illegible]0	96,300	118,100	22,100
Couplings	20,500	115,450	1[illegible]6,880	35,700	48,650	21,840
Stopcocks	17,150	28,700	26,800	4,600	3,500	.....
Street-washers	.....	.....	.....	.....	.....	.....
Public hydrants	500	.....	.....	.....	.....	8,600
Unclassified	32,200	.....	168,780	.....	199,360	114,672
Total gallons	1,454,600	1,[illegible]03,150	1,47[illegible],250	543,840	750,510	764,112
MAINS.						
Joints on mains	368,800	607,350	130,500	267,300	406,800	321,900
Broken mains	.....	142,800	115,000	18,000	.....	.....
Valves	300	3,300	13,000	5,500	3,200	1,300
Blow-offs	.....	8,600	15,000	.....	.....	.....
Fire hydrants	5,120	13,400	.....	.....	.....	11,600
Total gallons	374,220	775,450	273,500	290,800	410,000	334,800
Total miles	113	183	151.5	108	67	83
Average per mile	3,320	4,237	1,800	2,700	6,120	4,033
Grand total	1,828,820	1,[illegible]81,600	1,752,750	834,640	1,160,510	1,0[illegible]8,912

STATEMENT No. 4.—*Results, house inspection, 1907–1920.*

UNMETERED.

Year.	Houses inspected.	Houses with defective fixtures.	Percentage.
1907–8	(1)	(1)	(1)
1908–9	27,758	4,621	16.6
1909–10	21,642	3,305	15.2
1910–11	21,547	3,262	15.1
1911–12	31,283	4,943	15.7
1912–13	26,397	3,725	14.1
1913–14	17,039	1,603	9.4
1914–15	17,563	1,691	9.6
1915–16	6,191	480	7.8
1916–17	9,977	904	9.0
1917–18	3,897	447	11.2
1918–19	1,062	62	5.8
1919–20	5,256	368	7.0

[1] No record.

STATEMENT No. 5.—*Measurement of permanent districts, 1919–20.*

Districts.	Boundaries.	Date.	Consumption.	Night rate.	Per cent.
G	From E Street NE., to E Street SE., First to Eastern Branch.	Sept. 14 to Sept. 21, 1919.	3,384,000	2,078,700	61
I	Seventeenth Street to District line west, from Pennsylvania Avenue to Florida Avenue.	Nov. 18 to Nov. 24, 1919.	2,107,200	631,700	30
K	Eleventh to Seventeenth Streets, Pennsylvania Avenue, to Florida Avenue NW.	do	6,630,400	3,355,500	51
L	From L Street to Bryant Street, North Capitol to Eleventh Street NW.	Sept. 14 to Sept. 21, 1919.	7,999,000	4,398,800	55
Reno	Reno service east of Twenty-seventh Street NW.	Aug. 12 to Aug. 18, 1919.	1,457,100	879,800	60
Do	Reno service west of Twenty-seventh Street NW.	do	1,110,900	(?)	(?)

STATEMENT No. 6-A.—*Pitometer district A, survey No. 4.*

Date of measurement	
Mean daily supply	
Minimum night rate	
Ratio of minimum night rate to mean daily supply	
Subdivision survey:	
Started, Mar. 14, 1920.	
Finished, Aug. 22, 1920.	
Cost	$6,888.94
Population:	
Resident—	
Metered	No figures.
Unmetered	No figures.
Total	No figures.
Floating—	
Metered	No figures.
Unmetered	No figures.
Total	No figures.
Per capita consumption, computed from resident population	No figures.
Buildings:	
Dwellings—	
Metered	547
Unmetered	2,149

Buildings—Continued.	
Hotels and apartments—	
Metered	34
Unmetered	6
Municipal buildings—	
Metered	11
Unmetered	3
Federal buildings—	
Metered	19
Unmetered	0
Factories—	
Metered	6
Unmetered	5
Restaurants—	
Metered	0
Unmetered	0
Miscellaneous—	
Metered	1,137
Unmetered	875
Total—	
Metered	1,754
Unmetered	3,038
Night flow detected by subdivision, gallons per day	3,080,600
Due to inside flow:	
Metered	1,021,200
Unmetered	841,800
Due to underground leakage:	
Service pipes	401,700
Joints on mains	165,300
Valves	3,500
Total	570,500
Due to Federal buildings and fountains	377,000
Due to municipal buildings, flush basins, horse founts	221,300
Total flow accounted for	3,031,800
Total flow unaccounted for	48,800
Miles of mains	31

STATEMENT No. 6-B.—*Pitometer District G, Survey No. 5.*

Date of measurement, Sept. 14–Sept. 21, 1919.	
Mean daily supply	3,384,000
Minimum night rate	2,078,700
Ratio of minimum night rate to mean daily supply per cent	61
Subdivision survey:	
Started, July 13, 1919.	
Finished, Mar. 18, 1920.	
Cost	$7,029.35
Population:	
Resident—	
Metered	No figures.
Unmetered	No figures.
Total	No figures.
Floating—	
Metered	No figures.
Unmetered	No figures.
Total	No figures.
Per capita consumption, computed from resident population	No figures.
Buildings:	
Dwellings—	
Metered	6,945
Unmetered	397
Hotels and apartments—	
Metered	72
Unmetered	0

Buildings—Continued.	
Municipal buildings—	
Metered	12
Unmetered	0
Federal buildings—	
Metered	9
Unmetered	0
Factories—	
Metered	8
Unmetered	0
Restaurants—	
Metered	0
Unmetered	0
Miscellaneous—	
Metered	285
Unmetered	38
Total—	
Metered	7,331
Unmetered	435
Night flow detected by subdivision, gallons per day	951,700
Due to inside flow—	
Metered	580,700
Unmetered	60,700
Due to underground leakage—	
Service pipes	85,100
Joints on mains	22,700
Total	107,800
Due to Federal buildings and fountains	135,800
Due to municipal buildings, flush basins, horse founts	7,400
Total flow accounted for	892,400
Total flow unaccounted for	59,300
Miles of mains	44

STATEMENT No. 6-C.—*Pitometer districts Q and R (miscellaneous).*

Date of measurement, Aug. 21–Aug. 23, 1919.	
Mean daily supply	402,528
Minimum night rate	207,575
Ratio of minimum night rate to mean daily supply per cent	52
Subdivision survey:	
Started, Sept. 9, 1919.	
Finished, May 20, 1920.	
Cost	$2,678.86
Population:	
Resident—	
Metered	No figures.
Unmetered	No figures.
Total	No figures.
Floating—	
Metered	No figures.
Unmetered	No figures.
Total	No figures.
Per capital consumption, computed from resident population	No figures.
Buildings:	
Dwellings—	
Metered	1,008
Unmetered	77
Hotels and apartments—	
Metered	0
Unmetered	0
Municipal buildings—	
Metered	0
Unmetered	0
Federal buildings—	
Metered	1
Unmetered	0

Buildings—Continued.	
Factories—	
Metered	0
Unmetered	0
Restaurants—	
Metered	0
Unmetered	0
Miscellaneous—	
Metered	4
Unmetered	1
Total—	
Metered	1,013
Unmetered	78
Night flow detected by subdivision, gallons per day	81,200
Due to inside flow:	
Metered	72,400
Unmetered	0
Due to underground leakage:	
Service pipes	1,900
Total	1,900
Due to Federal buildings and fountains	0
Due to municipal buildings, flush basins, horse founts	5,800
Total flow accounted for	80,100
Total flow unaccounted for	1,100
Miles of mains	8

ACCOUNTS AND STORES.

SIR: The following report is submitted of work done by the division of accounts and stores for the fiscal year ended June 30, 1920.

The expense account and other tables herewith show in detail cost of operation and the volume of miscellaneous office work done.

I would suggest that action be taken at an early date to dispose of the valuable real estate and improvements in square No. 175, bounded by Sixteenth, Seventeenth, U, and V Streets NW. This property represents an investment of $66,500 of water department funds and is no longer used or needed by the water department. The sum realized from the sale of this property could be utilized to advantage in making needed extensions of the distribution system.

Miscellaneous office work.

Vouchers passed for payment	2,948
Requisitions made	645
Letters mailed	889
Official letters written	552
Work orders issued	1,150
Official files received and forwarded	1,271
Pay rolls made	1,227
Miscellaneous papers handled	56,658
Letters indexed and filed	1,694
Transfer vouchers made	268
Records made on cards	1,848
Total	69,150

The storekeeping and transportation of the department, under the direction of Mr. W. V. Robertson, made during the year a record for economy and efficiency. His report here follows:

STOREKEEPING.

The cost of operating the storekeeping division for the year was 4.13 per cent of the value of material issued and equipment disposed

of. A comparison of the percentages of cost for the past six years follows:

	Per cent.		Per cent.
1915	4.676	1918	3.13
1916	4.64	1919	3.72
1917	3.91	1920	4.13

The following table shops the values of material and equipment received and issued during the past six years:

Year.	Material.		Equipment.	
	Receipts.	Issues.	Receipts.	Issues.
1915	$2[illegible],152.74	$26[illegible],838.36	$170,1[illegible]0.78	$1,915.94
1916	255,174.17	25[illegible],945.05	2[illegible],4[illegible]1.[illegible]0	20,[illegible]79.82
1917	320,157.19	3[illegible]1,880.02	10,7[illegible]2.97	4,7[illegible]8.[illegible]
1918	38[illegible],113.88	321,578.56	4[illegible],[illegible]14.29	5,[illegible]9.[illegible]
1919	3[illegible]8,282.99	338,[illegible]28.15	22,804.[illegible]9	16,853.94
1920	28[illegible],213.37	2[illegible]0,[illegible]58.74	9,452.00	9,369.[illegible]

The value of material on hand at close of the year amounted to $209,964.14 and the value of equipment in stock and in service to $695,017.97.

TRANSPORTATION.

The completion of the motorization of the equipment used by this division was accomplished during the early part of the fiscal year.

The transfer of horses, horse-drawn vehicles, harness, and stable equipment through the office of the auditor, District of Columbia, and the substitution of automobile trucks was effected without confusion or embarrassment to any of the divisions of the department. The present transportation equipment comprises 35 automobile trucks of various capacities. The average number of trucks in daily service was 32.

Material hauled to construction forces and to storage yards, 10,207,054 pounds; dirt hauled from construction forces to various dumps, 1,200 cubic yards; ashes hauled from pumping station to various dumps, 1,300 cubic yards.

SAMUEL RIGGS,
Clerk in Charge.

The SUPERINTENDENT, WATER DEPARTMENT.

TABLE I.—*Statement of cash account of the water fund, District of Columbia, including appropriations and outstanding obligations, for the fiscal year ended June 30, 1920, as shown by the books of the Auditor, District of Columbia.*

Balances July 1, 1919:		
Cash in the Treasury of the United States	$162,725.53	
Cash in hand of the collector of taxes	3,223.83	
Cash to credit disbursing officer, District of Columbia	51,697.99	
		$217,647.35

Receipts for the year:		
Water rents	$771,161.45	
Taps and stopcocks	6,906.47	
Water-main assessments	41,010.28	
Interest	2,110.91	
Sale of material	1,164.01	
		$822,353.12
Repayments and credit transfers		29,575.31
		1,069,575.78
Expenditures for the year:		
Appropriations, water department, District of Columbia, 1920—		
Salaries—		
Revenue and inspection branch	38,329.44	
Distribution branch	51,434.00	
Contingent expenses	3,937.64	
General expenses	31,534.17	
High service	396,702.23	
Refunds	1,498.84	
		523,436.32
Increase of compensation, water department, District of Columbia, 1920		79,453.73
Appropriation, water department, District of Columbia, 1919—		
Contingent expenses	1,032.22	
General expenses	9,398.65	
High service	85,659.12	
Refunds	193.32	
		96,283.31
Increase of compensation, water department, District of Columbia, 1919		658.96
Appropriation, water department, District of Columbia, 1918—		
Contingent expenses	12.30	
General expenses	179.18	
High service	27,858.78	
		28,050.26
Appropriation, water department, District of Columbia, 1917—		
General expenses		18.10
Appropriation, water department, District of Columbia, 1916—		
Salaries, distribution branch	16.67	
High service	9,035.08	
		9,051.75
Total water department expenditures		736,952.43
Advances, account appropriations:		
Washington Aqueduct, District of Columbia	9,515.36	
Washington Aqueduct, District of Columbia, 1920	135,012.73	
Emergency fund, Washington Aqueduct, 1920	5,000.00	
Increase of compensation, Washington Aqueduct, 1920	19,001.15	
Washington Aqueduct, 1919	276.78	
Increase of compensation, Washington Aqueduct, 1919	13.20	
		168,819.22
Balances June 30, 1920:		
Cash in Treasury of the United States	127,466.02	
Cash to credit of disbursing officer, District of Columbia	36,338.11	
		163,804.13
		1,069,575.78

Balance in water fund, as stated above		$163,804.13
Less obligations against appropriations:		
Water department, District of Columbia, 1919—		
Contingent expenses	$14.88	
General expenses	118.80	
High service	483.20	
Water department, District of Columbia, 1920—		
Contingent expenses	404.59	
General expenses	4,743.01	
High service	40,534.19	
		46,298.67
Unobligated balance water fund June 30, 1920		117,505.46

TABLE II.—*Cost of work done by the water department for the year ended June 30, 1920.*

Heads of expenditure.	Per diem and salaries.	Material expended, cuts, transportation, etc.	Total expenditures.	Charged to general account.		Stable and deposit accounts, Dr.
				Maintenance.	Extensions.	
Water surveys (detection of leaks)	$24,863.73	$2,721.10	$27,584.83	$27,584.83	.....	.....
Installation and maintenance of meters	18,643.28	7,269.51	25,912.79	19,148.48	$6,764.31	.....
Office of water registrar	61,488.82	4,522.33	66,009.15	66,009.15	.....	.....
Inspection and repair of services	29,671.43	4,960.84	34,632.27	34,632.27	.....	.....
Tapping water mains	3,419.17	4,288.37	7,707.54	.....	7,707.54	.....
New services installed	1,220.80	875.44	2,096.24	.....	2,096.24	.....
Engineering (field surveys)	20,470.74	1,493.77	21,964.51	15,814.45	6,150.06	.....
Stable account	11,621.02	3,709.75	15,330.77	.....	.....	$15,330.77
Operation and repair of valves, fire hydrants, etc	22,775.60	4,365.18	27,140.78	27,140.78	.....	.....
New street hydrants and fountains erected	99.51	138.59	238.10	.....	238.10	.....
Water mains laid	31,083.19	75,142.38	106,228.57	.....	106,228.57	.....
Repairs to leaks	19,258.27	7,083.88	26,342.15	26,342.15	.....	.....
Maintenance of reservoirs, lodges and towers	6,441.14	2,307.31	8,748.45	8,748.45	.....	.....
Care of grounds	6,229.13	261.00	6,490.13	6,490.13	.....	.....
Repavment and deposit work	14,485.66	9,878.46	24,364.12	.....	.....	24,364.12
Replacement work, lowering mains, etc	3,937.32	6,889.72	10,827.04	10,827.04	.....	.....
Plans, estimates, and tests	11,820.36	285.85	12,106.21	8,716.47	3,389.74	.....
Care of Bryant Street pumping station	16,523.68	3,544.10	20,067.78	20,067.78	.....	.....
Operation and repair, pumps, Bryant Street station	49,028.18	69,262.32	118,290.50	118,290.50	.....	.....
Operation and repair, pumps, Reno station	3,606.92	2,018.00	5,624.92	5,624.92	.....	.....
Operation and repair, pumps, Anacostia station	6,562.48	2,564.72	9,127.20	9,127.20	.....	.....
New pumping equipment	758.41	29,075.16	29,833.57	.....	29,833.57	.....
Shopwork	25,103.12	13,988.12	40,091.24	32,278.97	7,812.27	.....
Furnished other District of Columbia offices	3,553.04	1,455.13	5,008.17	5,008.17	.....	.....
Gross expenditures	393,666.00	258,101.03	651,767.03	441,851.74	170,220.40	39,694.89

SUMMARY.

Expenditures:		Charged to:		Per cent.
Per diem pay rolls	$299,208.16	Maintenance	$441,851.74	72.2
Salary pay rolls	94,457.84	Extensions	170,220.40	27.8
Total services	393,666.00			
Material expended, cuts, etc	258,101.03			
Gross expenditures	651,767.03			
Less transportation and repayment credits	39,694.89			
Net expenditure	612,072.14	Net expenditure	612,072.14	100.0

BLE III.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work.*

Diameter.	In service June 30, 1919.	Laid during year ended June 30, 1920.	Abandoned during year ended June 30, 1920.	In service June 30, 1920.
h.....linear feet..	83,416	338	3	83,751
h.....do....	154,989	805	86	155,708
h.....do....	1,468,143	356	767	1,467,732
h.....do....	897,064	21,255	140	918,179
ch.....do....	9,107	.....	.....	9,107
ch.....do....	393,994	7,601	254	401,344
ch.....do....	25,088	930	.....	26,018
ch.....do...	114,064	.....	.....	114,064
ch.....do....	34,766	.....	.....	34,766
ch.....do....	58,000	.....	.....	58,000
ch.....do....	59,437	.....	4	59,433
ch.....do....	23	.....	.....	23
ch.....do....	44,172	.....	.....	44,172
ch.....do....	600	.....	.....	600
Total.....	3,372,863	31,288	1,254	3,372,897
valves.....	10,865	218	79	11,004
hydrants.....	3,610	60	21	3,649
hydrants.....	2,333	17	18	232
itary fountains.....	17	.....	.....	17
se fountains.....	156	4	3	157
well (deep).....	42	.....	1	41
lic wells (shallow).....	3	.....	.....	3

BLE IV.—*Statement of the length and cost of water mains laid from July 1, 1878, to June 30, 1920, paid from water department funds.*

Diameter.	In service June 30, 1919.	Laid during year ended June 30, 1920.	Abandoned during year ended June 30, 1920.	In service June 30, 1920.
nch.....linear feet..	76,822	.....	.....	76,822
nch.....do....	117,116	454	86	117,484
nch.....do....	1,079,138	50	656	1,079,532
nch.....do....	837,832	21,216	116	858,932
inch.....do....	6,739	.....	.....	6,739
inch.....do....	344,794	7,493	208	352,079
inch.....do....	17,940	930	.....	18,870
inch.....do....	102,970	.....	.....	102,970
inch.....do....	14,494	.....	.....	14,494
inch.....do....	20,737	.....	.....	20,737
inch.....do....	38,248	.....	4	38,244
inch.....do....	23	.....	.....	23
inch.....do....	14,309	.....	.....	14,309
Total.....	2,671,862	30,143	1,070	2,700,935

Total cost to June 30, 1919.....	$4,032,965.59
Total cost for year ended June 30, 1920.....	106,228.57
Aggregate cost to June 30, 1920.....	4,139,194.16

REPORT OF THE WATER REGISTRAR.

WASHINGTON, *September 16, 1920.*

SIR: I submit herewith the annual report of the revenue and inspection branch of the water department showing in detail the work accomplished during the year ended June 30, 1920.

INSTALLATION OF WATER METERS.

The increased cost of meters, labor, and material, as well as the scarcity of labor, precluded the possibility of extensive metering during the year, and the work of installation consisted only of metering the services of some of the new houses in those sections which had been previously metered.

The number of meters installed during the year was 98, and the number discontinued was 32, making the total now in use 61,365.

The following shows the average cost of installing a meter for the fiscal years ended June 30, 1916, to June 30, 1920:

	1916	1917	1918	1919	1920
Meter	$5.00	$5.75	$6.38	$7.75	$10.00
Material	3.37	5.09	5.63	5.12	6.73
Labor	2.90	2.61	3.75	5.96	10.46
Total	11.27	13.45	15.76	18.83	27.19

LEAKS AND WASTES.

During the year 15,001 examinations for leaks were made. This included ordinary leaks at house fixtures and the more complicated cases of underground leaks, the detection of which required considerable time and the employment of experienced men, and very fortunately the office was able to maintain a force qualified for this purpose through the most trying times that have yet been experienced.

In all 72 water services were discontinued at the tap in the main. The water supply was cut off from 96 houses this year during the period of vacancy, which has prevented the reoccupying of the houses without the knowledge of the office, thus preventing a loss of revenue.

SERVICE CONNECTIONS.

There were 951 new service connections made, inspected, and locations recorded during the year; also 650 repairs, etc., to water services and appurtenances were inspected and recorded.

This work was handled by the regular inspector with some assistance from the office force, and inspections have been made in the majority of cases within one hour of the time specified by the plumber doing the work.

Owing to the reduction in the number of new service connections, the tapper has been used in connection with leaks and wastes and the taking out and replacing of meters, thus keeping these branches of the work up to date. This detail did not occasion any loss of time in connection with the tapping of water mains, and saved the employment of more men in the subdivision to which the assistance was given.

REVENUES.

The table of comparative revenues shows a total collection of $854,625.45.

Table 1 shows statement of collections and expenditures.

Table 2 shows comparative statement of revenues.

Table 3 shows number of meters in service.

Table 4 shows consumption of water in buildings owned or controlled by the District of Columbia.

Table 5 shows consumption of water in charitable institutions, hospitals, etc., which receive an allowance of free water.

Table 6 shows general information.

WATER RATES.

There has been no change in the water rates during the past year. The rate for domestic purposes was charged according to stories and

ont feet. On all tenements two stories high with a frontage of 16 et or less, $5 per annum; for each additional front foot, or fraction ereof greater than one-half, 31 cents. For each additional story or rt thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume business, and water facilities, and rate from $1 to $25. If the flat te on business establishments reaches $25 or more, the owner or cupant is required to install a water meter at his own expense.

Meter rates.—A minimum rate of $4.50 was charged against all nsumers supplied with water through meters, which allowed the e of 7,500 cubic feet of water during the fiscal year, water used in cess of this quantity being charged for at the rate of 4 cents per 0 cubic feet.

Increase of rates.—Under the act of Congress approved June 5, 20, the water rates were increased 25 per centum to take effect ly 1, 1920.

According to the new schedule, on all tenements two stories high ith a frontage of 16 feet or less, $6 25 per annum; for each additional front foot, or fraction thereof greater than one-half, 39 cents. or each additional story or part thereof, one-third of the charges as mputed above.

Business premises are rated according to their size, class, volume f business, and water facilities, and rate from $1 to $25. If the flat ite on business establishments reaches $25 or more, the owner or ocipant is required to install a water meter at his own expense.

A minimum rate of $5.65 will be charged against all consumers upplied with water through meters, which allows the use of 7,500 ubic feet of water during the year; water used in excess thereof will e charged for at the rate of 5 cents per 100 cubic feet.

CONDITION OF THE WORK.

Notwithstanding the fact that there has been a large increase in usiness over that of previous years, owing to the growth of the popuation, the condition was met without any addition to the force and he work was up to date at the close of the year.

This result was obtained by the faithful cooperation of the employees, for which I now take pleasure in expressing my appreciation.

GEO. W. WALLACE,
Water Registrar.

The SUPERINTENDENT, WATER DEPARTMENT.

TABLE 1.—*Statement of collections.*

Water rents:	
Flat rate	$80,748.34
Meters	686,459.57
Building purposes	3,953.64
Total	771,161.55
Water-main tax, principal and interest	43,121.19
Taps and stopcocks	6,906.47
Miscellaneous receipts	1,164.01
Total	51,191.67
Total receipts	822,353.22
Repayments, deposits, and special appropriations	32,272.23
Total receipts and repayments	854,625.45

TABLE 2.—*Statement of cash receipts and expenditures of the water fund, District of Columbia, for the fiscal years from June 30, 1903, to June 30, 1920.*

Year.	Water rents.	Water-main tax, principal and interest on same.	Taps and stopcocks.	Miscellaneous receipts.	Repayments, deposits, and special appropriations.	Total receipts and repayments, balance brought forward.
1903						$341,337.37
1904	$311,947.53	$51,713.64	$6,522.67	$865.26	$16,074.20	417,123.30
1905	352,156.93	32,217.84	8,603.80	2,819.95	27,652.46	423,450.86
1906	362,266.54	34,395.76	9,100.00	23.60	25,187.61	430,873.51
1907	468,889.47	51,319.62	9,487.10	6,254.73	19,912.51	555,863.63
1908	479,981.22	57,462.39	8,688.10	1,376.24	47,984.45	595,492.49
1909	502,894.45	57,654.06	10,674.15	1,530.08	49,875.59	622,628.33
1910	509,769.23	76,905.15	11,791.78	1,715.20	26,498.58	626,682.94
1911	521,581.78	101,987.53	8,824.35	960.04	94,520.49	727,974.19
1912	545,405.47	122,458.81	11,438.65	2,817.50	110,441.39	792,561.82
1913	640,008.64	138,693.57	8,685.50	3,153.81	14,923.91	805,465.43
1914	646,296.15	86,379.21	6,118.20	4,253.20	24,131.64	767,178.40
1915	638,861.89	66,107.56	6,559.89	3,532.77	14,513.50	729,575.61
1916	624,882.18	64,647.80	7,020.80	1,761.39	24,669.74	722,981.91
1917	636,664.31	61,990.43	5,484.62	2,019.58	25,551.56	731,710.50
1918	714,388.28	34,649.46	3,705.65	458.96	44,391.59	797,503.94
1919	782,159.36	28,179.43	4,810.28	1,482.58	109,837.37	926,469.02
1920	771,161.55	43,121.19	6,906.47	1,164.01	32,272.23	854,625.45
Total	9,539,314.98	1,109,883.45	134,425.01	36,188.90	708,438.84	11,869,588.53
1921 [1]	962,000.00	40,000.00	6,000.00	500.00		[2] 1,010,500.00
1922 [1]	956,000.00	40,000.00	6,000.00	500.00		[2] 1,002,500.00

[1] Estimated. [2] Estimated total revenue.

TABLE 3.—*Water meters in use June 30, 1920.*

Name.	Inches.										Total.
	⅝	¾	1	1¼	1½	2	3	4	6	8	
American	154	3	12	3	6	2					180
American, new model	60										60
Crown	1	10	25		22	9	7		1		75
Empire	36	22	7		5	4	3	1	1		79
Enarc		20	28	5	28	20					111
Eureka								1			1
Gamon	28										28
Gem						17	16	8	1		42
Hersey, disk		617	47	3	92	27	18	8	2		814
Hersey, model F	21,254										21,254
Hersey, torrent							2	3	1		6
Hersey, detector							12	12	18	6	48
Keystone, Pittsburg		43	47	1	33	21	26	4			175
Keystone, model W	11,125										11,125
King	134		4		8	1					147
Lambert (172 old style included)	1,011	182	118		103	65	34	7	1		1,551
Lambert, special	360										360
Lambert, glass lid	65										65
Nash	113	182	346		255	109	42	15			1,062
Niagara		74	94	31	103	72	13				387
Nilo									1	1	2
Standard	1				3						4
Thomson	1	4	15		21	18	1	1			61
Trident, disk	2,137	83	112		104	27	4	1			2,468
Trident, crest						1	7	17	1		26
Trident, compound							3	1			4
Union		1	5		2	1					9
Worthington	196	47	62	18	37	30	27	10			427
Model D	27										27
Model G, old	70										70
Model G, new	3,014										3,014
Model K	17,678										17,678
Total	57,495	1,288	922	61	832	424	215	89	27	7	61,360
Registers											5
Total meters and registers											61,365

TABLE 4.—*Showing consumption of water in buildings owned or controlled by the District of Columbia.*

	Annual consumption.	Premises.	Meters.
	Cubic feet.		
District building	5,452,800	1	2
Schools and annexes	66,519,200	150	157
Fire-engine houses, etc.	2,796,700	37	38
Police stations	4,019,500	13	13
Playgrounds	2,062,000	6	6
Public-comfort stations	1,288,200	3	3
Stables	1,231,700	8	11
Workhouse grounds	741,800	7	7
Industrial schools	1,088,100	1	4
Miscellaneous	7,694,200	28	35
Total	92,894,200	254	276

TABLE 5.—*Premises which receive an allowance of free water.*

Premises.	Consumption.	Allowance.	Exceeded.	Paid.	Meters.	Premises.
Churches	3,040,000	6,550,810	17	$501.08	108	92
Homes	4,208,500	4,341,900	9	414.65	20	27
Hospitals	11,300,100	10,781,800	7	1,102.32	15	11
Neighborhood houses	54,000	528,400	.....	.....	4	3
Orphan asylums	1,505,500	1,792,500	2	4.36	12	7
Schools	2,313,000	6,557,500	1	266.48	15	12
Total	22,424,100	30,551,910	36	2,288.89	183	152

TABLE 6.—*General information.*

Average cost of installing a water meter by the department:		
Meter		$10.00
Material		6.75
Labor		10.44
Total		27.19
Cost of labor and material for maintenance of meters		15,280.44
Average cost per meter for maintenance		.25
Consumption of water through meters:		
District meters	cubic feet	569,100,200
District meters in municipal buildings	do	87,441,400
Private meters	do	804,842,300
Private meters in charitable institutions	do	22,424,100
Total		1,483,858,000

Meters in service.	In use June 30, 1919.	Installed 1920.	Abandoned 1920.	Total in use June 30, 1920.
District meters	58,035	65	12	58,088
District meters in Municipal buildings	264	.....	.....	264
Private meters	2,815	28	18	2,825
Private meters in charitable institutions	185	5	2	188
Total	61,299	98	32	61,365

Average cost of reading meters	$0.17
Average cost of computing and making bills	.18
Average payment for premises in which meters were installed	6.20
Average payment for flat-rate accounts	7.49
Difference	1.29

Revenue:		
For metered water—		
District of Columbia meters	$360,280.12	
Private meters	326,179.75	
		$686,459.87
For flat-rate accounts—		
Water rents	80,748.34	
Building purposes	3,953.64	
		84,701.98
Total revenues for the fiscal year 1919		771,161.55
Water services:		
In use June 30, 1920	71,275	
Installed, 1920	951	
		72,226
Abandoned, 1920		77
In use June 30, 1920		72,149
Metered		61,365
Not metered		10,784
Percentage of services metered		85

NOTE.—The low average cost of maintenance of meters was due to the fact that a large number could not be repaired owing to the lack of material.

REPORT OF THE SANITARY ENGINEER.

WASHINGTON, D. C., *September 1, 1920.*

SIR: In submitting this annual report for the fiscal year ending June 30, 1920, it is considered highly desirable to direct your particular attention to three important features, in their way basic features, of the sanitation and drainage for the District of Columbia. These are all important developments of the sewage-disposal system.

The first of these in importance is the removal of the great volume of sewage now being discharged into the Potomac River above the mouth of Rock Creek and its diversion to the sewage disposal system. This will be accomplished by the completion of the upper Potomac interceptor, planned to extend as far up river as the Chain Bridge. Beyond its present terminus there now remains more than 3 miles of this important interceptor to be built, involving an expenditure of more than $400,000. Already the conditions at the Chain Bridge are grossly insanitary, due to the discharge of a large and increasing volume of sewage upon the near-by river flats, and other outlets between the Aqueduct Bridge and Chain Bridge are hardly less unsatisfactory.

In addition it must be pointed out that the river waters immediately after pollution by the sewage of several thousand people flow directly into the Tidal Basin in Potomac Park, where the new public bathing beach is located. Until this sewage pollution is effectually removed the public bathing beach must be considered to be a menace to the public health. This important interceptor should be completed at the earliest date practicable. At the rate funds were provided in the appropriation bill for the fiscal year 1921 it can not be completed prior to 1936.

The second important needed sanitary improvement has to do with the pollution of the park streams, and especially Rock Creek and the Eastern Branch, which flow for many miles through highly developed parkways or parkways now in course of development. Along both of these streams interceptors have been designed, and for a portion of the way have been constructed. Between 3 and 4 miles of intercepting sewers are required to complete these projects. Estimates have been submitted each year for a number of years, request

ng funds to complete these works, but no appropriation obtained. Together they will require an expenditure of between $500,000 and $600,000. In view of the development of sewerage in the Maryland territory adjacent to the District, which already is adding a heavy load of sewage pollution to these streams, the completion of these projects, affording as it does the only possible relief, is of very great importance. The condition of these streams, their sources of pollution, and the remedy for same have been set forth in each annual report of the sanitary engineer for more than 10 years.

The third important project is for the construction of sewage-treatment works for the District of Columbia, to be located at the extreme southerly end of the District, for the purification of the entire volume of sewage, now amounting to more than 25,000,000,000 gallons annually. Under the load of this enormous volume of sewage the condition of the river waters is steadily deteriorating. As indicated elsewhere in this and previous reports, the condition of these waters is approaching the limit of a reasonable standard of sanitation, and is now such, in fact, that oxygen tests show a minimum less than sufficient to maintain fish life. The tentative approximate estimate for installing these sewage-treatment works is $4,500,000.

Steadily diminishing funds have been allowed for these developments of the sewage disposal system, so that with all of the above projects authorized or committed, the appropriation for the fiscal year 1921 was so small that, with the same annual rate of appropriation, 200 years will be required to complete these projects.

Meanwhile other important projects of the sewage disposal system, long planned and developed by the sanitary engineer, have been waiting authorizations and are beginning to call for construction in the near future. The Oxon Run interceptor, for example, needed for the sanitary drainage of the entire area beyond the Anacostia River from Good Hope Road to the southerly corner of the District will require about $1,000,000. Already within its area are many dwellings with requests and petitions for sewerage. The Oxon Run interceptor is the vital feature of this sanitary system now and is the permanent future collecteur which will transport all of the sanitary drainage to the projected sewage treatment works at Shepherds, on the Potomac River.

In this connection it is to be noted also that the existing sewage disposal system, as planned by the Board of Sanitary Engineers in 1890, will have reached the maximum capacity defined for these works about the year 1930, and that thereafter additional funds will also be required for increasing the capacity of the existing sewage disposal system.

Extremely conservative estimates for the sewage disposal system have been submitted each year by the sanitary engineer, but these have been so reduced as to permit very little progress in the development of these works, and the allowance of funds has diminished instead of increasing proportionately with the increased budget. This is well shown by a comparison between the appropriations for the fiscal years 1917 and 1921. The total District appropriation for the fiscal year 1921 was approximately 50 per cent in excess of the appropriation for the fiscal year 1917, while the appropriation for sewage disposal system in 1921 was only one-fourth of the appropriation

allowed for 1917, or a relative reduction to 12½ per cent. The figures for these years are as follows:

1917. Total District appropriation	$12,581,117.20
1917. Total sewage disposal system appropriation	119,500.00
1921. Total District appropriation	18,373,004.87
1921. Total sewage disposal system appropriation	30,000.00

Inadequate compensation has caused the loss during the year of two highly efficient and experienced employees—the assistant engineer in charge of the sewage disposal system and the chief computer. Within a few years five assistant engineers, technically trained men have resigned and at present there are but two assistants on the sanitary engineer's staff who are technical graduates.

The following tabulation shows the increases in compensation which have been allowed from 1914 to 1920 covering all classes of service in this division. In order to make a comparison annual rates have been reduced to per diem rates as noted.

Tabulation showing the increases in compensation granted and what kinds of employment have most benefited therefrom.

Position.	Compensation year 1914, pay per day.	Compensation year 1920, pay per day.	Increase 1920 over 1914, per cent.
Sanitary engineer [1]	$9.17	[2] $8.94	− 2½
Assistant engineer [1]	5.83	[2] 6.77	13
Do.[1]	5.00	[2] 5.51	10
Do.[1]	4.44	[2] 5.01	13
Do.[1]	4.17	[2] 4.71	12
Rodman [1]	2.17	[2] 3.09	42
Chainman [1]	1.81	[2] 2.60	43
General overseers [3]	5.00	[2] 7.58	51
Inspector [1]	4.17	[2] 4.71	12
Do.[1]	3.89	[2] 4.45	14
Do.[1]	3.61	[2] 4.17	15
Do.[1]	3.33	[2] 4.68	40
Chief clerk [2]	4.17	[2] 6.12	46
Clerk [1]	3.33	[2] 4.71	41
Do.[1]	2.78	[2] 3.90	40
Do.[1]	2.78	[2] 3.35	20
Draftsman [1]	3.33	[2] 3.90	17
Do.[1]	2.92	[2] 3.51	20
Principal steam engineer [1]	5.00	[2] 6.30	26
Steam engineer [1]	3.33	[2] 6.36	91
Assistant steam engineer [1]	2.92	[2] 5.26	80
Fireman [1]	2.43	[2] 4.39	80
Oilers [1]	1.67	[2] 3.90	133
Machinists [3]	4.50	6.77	50
Blacksmith [3]	4.50	6.77	50
Carpenter [3]	4.50	6.77	50
Painter [3]	4.00	6.29	57
Electrician [3]	4.50	6.77	50
Tinner [3]	3.00	5.73	91
Steamfitter [3]	4.00	6.77	69
Bricklayer [3]	5.00	7.41	48
Skilled laborer [3]	2.25	4.69	108
Laborer [3]	1.75	3.65	109
Wagon driver [3]	1.75	3.65	86

[1] Annual compensation reduced to per diem basis.
[2] Per diem compensation 1920 reduced by pay withheld for retirement fund.
[3] Per diem compensation.

The details of the work for the fiscal year are given in sections A, B, C. D. E, F, and G, which follow with accompanying tables appended thereto.

ASA E. PHILLIPS,
Sanitary Engineer.

The ASSISTANT TO THE ENGINEER COMMISSIONER.

SECTION A.—ENGINEERING DATA, DESIGNS, AND DRAINAGE STUDIES.

The general engineering data for the year included rainfall, run-off, and river flow records, as well as determination of the oxygen content of the waters of the Potomac in the vicinity of the outfall as a test of their present condition affected by discharging the entire sewage of the District of Columbia therein without treatment; also, bacteriological examination of the park streams flowing into and through the District of Columbia which carry at present a large volume of sewage from the neighboring villages and towns of Maryland. The results of these oxygen and bacteriological tests are set forth in detail with comments as to same elsewhere in this section.

METROPOLITAN SEWERAGE PROJECT.

It is recorded with great regret that no actual construction work has been accomplished during the year by the Maryland Sanitary Commission toward the removal of the increasing volume of sewage now polluting the park streams of the District.

RIVER CONDITIONS AS TO SEWAGE DISPOSAL.

The condition of river waters during the year has not been satisfactory. While only during the month of September the condition was decidedly below normal, this in great part has only been due to the exceptionally large average monthly flow and high minimum flow of the river during the year. During a dry year it must be anticipated that these conditions, especially with very low minimum, will become seriously aggravated.

Comparative oxygen tests of samples of Potomac River waters taken near main sewage outfall and from the upper river for the past three fiscal years.

Fiscal year.	Location of samples taken on Potomac River.	Oxygen per cent saturation.											
		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
	MEAN.												
1918	Dilution basin	64	65	70	62	(1)	91	(1)	(1)	(1)	(1)	(1)	(1)
1919	do	(1)	70	74	63	82	88	(1)	(1)	(1)	90	91	(1)
1920	do	(1)	(1)	50	69	78	94	(1)	(1)	(1)	94	81	84
1918	Upper river	87	90	92	89	(1)	97	(1)	(1)	(1)	(1)	(1)	(1)
1919	do	(1)	71	90	89	92	96	(1)	(1)	(1)	98	97	(1)
1920	do	(1)	(1)	85	88	94	99	(1)	(1)	(1)	97	97	94
	MINIMUM.												
1918	Dilution basin	43	55	55	59	(1)	91	(1)	(1)	(1)	(1)	(1)	(1)
1919	do	(1)	45	52	62	76	82	(1)	(1)	(1)	83	88	(1)
1920	do	(1)	(1)	23	58	55	87	(1)	(1)	(1)	91	76	74
1918	Upper river	81	86	89	84	(1)	97	(1)	(1)	(1)	(1)	(1)	(1)
1919	do	(1)	49	95	87	84	95	(1)	(1)	(1)	96	95	(1)
1920	do	(1)	(1)	78	85	79	99	(1)	(1)	(1)	92	96	90
	MAXIMUM.												
1918	Dilution basin	77	69	93	74	(1)	91	(1)	(1)	(1)	(1)	(1)	(1)
1919	do	(1)	85	93	72	88	95	(1)	(1)	(1)	98	95	(1)
1920	do	(1)	(1)	66	80	86	97	(1)	(1)	(1)	97	86	97
1918	Upper river	93	94	96	96	(1)	97	(1)	(1)	(1)	(1)	(1)	(1)
1919	do	(1)	84	95	92	95	98	(1)	(1)	(1)	100	99	(1)
1920	do	(1)	(1)	91	91	98	100	(1)	(1)	(1)	100	98	100

[1] Sampling interrupted.

The record for the month of September shows very vividly the serious inroad the present sewage discharge is making on the stability of the river waters. With a mean flow of 2,154 second-feet, the mean oxygen content had fallen to 50 per cent as compared with 70 per cent in 1918, when the mean river flow was 4,956 second-feet.

BACTERIOLOGICAL SURVEY OF STREAMS.

The condition of the streams where they enter the District of Columbia has been under observation throughout the year and the increase in this pollution by bacteriological determination has been appreciable. These undesirable conditions are becoming more apparent on account of recent construction of sewerage systems in the bordering Maryland towns, where sewage is discharged directly into these streams.

The following tabulation from bacteriological determinations of samples of stream waters from those collected by the sewer department shows the present pollution of these streams. The results given were obtained by the bacteriological laboratory of the United States Public Health Service. Acknowledgments are due to the Public Health Service for their valuable assistance in obtaining this data.

Bacteriological survey of streams, showing total bacteria and bacilli coli per cubic centimeter in analysis of samples taken from streams as located.

Date.	Little Falls Branch at Wisconsin Avenue.		Willetts Brook at River Road.		Rock Creek at District of Columbia line.		Anacostia River at Bladensburg Road.	
	Total bacteria.[1]	Bacilli coli.	Total bacteria.[1]	Bacilli coli.	Total bacteria.[1]	Bacilli coli.	Total bacteria.[1]	Bacilli coli.
1919.								
Sept. 4			500	1,000	1,300			
Sept. 25							2,200	1,000
Sept. 30	3,000	100	3,000	1,000	2,000	10		
Oct. 6							3,000	100
Oct. 15	90,000	10,000	28,000	1,000	48,000	100		
Oct. 22							12,000	1,000
Oct. 28	1,500		11,000	1,000	1,950	10		
Dec. 30							3,000	1,000
1920.								
Jan. 15	6,000		2,000	1,000	870	100		
Feb. 4							120,000	10,000
Apr. 7	13,000	1,000	8,000	1,000	1,000	10		
May 11	100,000	10,000	2,200	1,000	2,900	100		
May 19							10,000	100
June 2	23,000	10,000	1,750	10,000	2,400	1,000		

[1] Total bacteria on agar 37°.

The following is a tabulation of the flow of the Potomac River for each month of the year together with the average discharge through the outfall. The latter includes considerable storm water, ground water, and stream flow from suburban areas, as well as leaks and wastes of the water supply system.

The actual ratio to river flow is given in this tabulation, as well as the ratio of effective dilution obtained.

River flow and dilution ratio.

Month.	River flow.			Outfall discharge.	Ratio of mean pumpage to mean river flow.	Effective dilution obtained.[1]
	Maximum.	Minimum.	Mean.			
1919.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Second-feet.*		
July	24,750	2,490	9,344	129	1 : 72	201 : 1
August	6,725	1,850	3,922	126	1 : 31	85 : 1
September	2,810	1,550	2,154	127	1 : 17	88 : 1
October	6,010	1,250	2,953	123	1 : 24	65 : 1
November	17,625	2,810	5,778	121	1 : 48	121 : 1
December	18,250	4,625	10,809	119	1 : 91	231 : 1
1920.						
January	37,625	8,750	15,637	117	1 : 133	378 : 1
February	18,750	12,500	10,269	113	1 : 90	327 : 1
March	70,500	11,910	37,124	116	1 : 320	338 : 1
April	41,000	10,775	18,101	121	1 : 150	390 : 1
May	16,875	6,060	10,577	111	1 : 95	324 : 1
June	21,750	4,910	10,677	114	1 : 94	229 : 1

[1] This column indicates the ratio of mean river flow to sewage, rated at 30 gallons per capita per day for the contributing population.

During the past 12 months the river flow has fallen below 1,400 second-feet on 1 day, below 1,600 second-feet on 7 days, below 1,800 second-feet on 2 days, below 2,000 second-feet on 15 days. The minimum flow was 1,250 second-feet on October 5, 1919, and the maximum flow was 70,500 second-feet on March 13, 1920. The mean flow for the year was 11,450 second-feet. The minimum flow for the preceding year was 1,350 second-feet, the maximum flow was 80,875 second-feet, and the mean flow 10,440 second-feet.

The following is a tabulation of the minimum flow of the Potomac River in second-feet for the past 10 calendar years:

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911	2,[illegible]0	7,4[illegible]0	6,270	8,650	2,850	3,050	856	1,490	4,400	5,600	3,660	4,210
1912	2,120	1,250	10,500	8,960	7,900	5,212	4,825	2,812	2,175	2,812	2,812	2,812
1913	8,120	[illegible],325	[illegible],2[illegible]8	10,225	5,012	4,050	3,925	2,1[illegible]0	[illegible]88	2,050	4,162	5,288
1914	10,[illegible]00	7,325	7,1[illegible]8	11,7[illegible]8	4,050	2,775	1,350	1,098	804	1,015	804	1,[illegible]75
1915	5,662	12,5[illegible]0	4,998	3,900	4,125	4,[illegible]50	2,[illegible]88	1,550	3,125	[illegible],463	1,6[illegible]8	3,612
1916	7,712	11,175	10,550	12,750	6,362	4,700	3,010	2,700	1,[illegible]87	1,612	1,207	1,575
1917	4,125	2,250	6,087	6,[illegible]25	3,010	2,487	2,875	1,287	8[illegible]0	900	1,575	2,075
1918	(1)	12,0[illegible]0	7,100	17,[illegible]75	3,675	2,750	2,710	2,875	2,400	1,[illegible]50	2,580	3,225
1919	9,100	5,250	8,050	6,725	5,8[illegible]0	5,610	2,490	1,850	1,550	1,250	2,810	4,[illegible]25
1920	8,750	12,560	11,910	10,775	6,000	4,910	.....	.....	.....	.....	.....	.....

[1] No record on account of ice.

RAINFALL AND RUN-OFF.

Data for run-off studies includes rainfall records from 3 automatic and 21 ordinary rain gauges, distributed over 50 square miles of area, as well as discharge and flow-line observations for excessive storms in a number of the main drainage lines.

No rainfalls of exceptional intensity occurred during the year, but the abnormal rain storm of July 2, 1920, is here tabulated. This great precipitation surcharged a number of the comparatively modern storm trunk lines beyond any previous record; while none of the main drainage arteries designed and built in the last 15 years were thus affected, a number of the very important trunk lines built in the last 30 years failed to afford adequate capacity for the storm discharge and many cases of flooding resulted therefrom.

Excessive storm of July 2, 1920.

DEPTH OF PRECIPITATION.

[Depth in inches at time indicated.]

Gauge.	6:40	6:45	6:50	6:55	7:00	7:05
No. 4. Twent[illegible] fourth and M Streets NW	0.00	0.20	0.4[illegible]	0.88	1.26	1.39
No. 10. First and O Streets SE	.00	.30	.48	.65	.85	1.00
No. 16. Twent[illegible]rst and A Streets NE	.0[illegible]	.42	.60	.88	1.00	1.10

UNIT DEPTHS OF PRECIPITATION.

[Depth in inches for each 5 minute period.]

Gauge.	6:40 to 6:45	6:45 to 6:50	6:50 to 6:55	6:55 to 7:00	7:00 to 7:05
No. 4. Twent[illegible] fourth and M Streets NW	0.20	0.23	0.45	0.38	0.13
No. 10. First and O Streets SE	.30	.18	.17	.20	.15
No. 16. Twent[illegible]rst and A Streets NE	.42	.18	.28	.12	.10

Excessive storm of July 2, 1920—Continued.

RATE OF PRECIPITATION.

[Rate in inches per hour during periods of time indicated.]

Gauge.	Minutes.				
	5	10	15	20	25
No. 4. Twenty-fourth and M Streets NW	2.40	2.58	3.52	3.78	3.48
No. 10. First and O Streets SE	3.60	2.88	2.60	2.55	2.50
No. 16. Twenty-first and A Streets NE	5.04	3.60	3.52	3.00	2.75

The following tabulations give the total rainfall for the excessive storm of July 2, 1920, as recorded at each of the 24 gauges, and the annual rainfall for the past 10 calendar years:

Tabulation of the total observed rainfall for the excessive storm of July 2, 1920, as recorded at 24 stations.

Station No.	Location of gauge.	Radial distance miles from center.	Total rainfall July 2, 1920.
1	Pennsylvania Avenue and Fourteenth Street, center of area	0.00	2.64
2	Tenth and G Streets SW	.40	1.75
3	Seventeenth and K Streets NW	.60	2.21
4	Twenty-fourth and M Streets NW	1.20	2.88
5	Delaware Avenue and C Streets NE	1.20	3.00
6	New York Avenue and New Jersey Avenue NW	1.20	2.48
7	Seventeenth and U Streets NW	1.40	3.13
8	North Carolina Avenue and Seventh Street SE	1.90	1.95
9	Rock Creek and Massachusetts Avenue NW	2.00	3.10
10	First and O Streets SE	2.10	1.85
11	Dent Place and Thirty-fifth Street NW	2.20	4.00
12	Filtration plant	2.20	3.00
13	Maryland Avenue and Thirteenth Street NE	2.20	2.00
14	Zoological Park	2.40	3.30
15	Park Road and Holmead Place NW	2.40	3.55
16	Twenty-first and A Streets NE	3.00	1.90
17	Fourteenth and V Streets SE	3.00	2.50
18	Twelfth and Monroe Streets NE	3.30	3.10
19	Fourth Street and Nichols Avenue SE	3.90	1.00
20	Nebraska Avenue and Tunlaw Road NW	4.20	2.63
21	Georgia Avenue and Nicholson Street NW	4.40	3.00
22	Minnesota Avenue and Gault Place NE	4.70	2.00
23	Conduit Road and Little Falls Road NW	5.10	2.20
24	Great Falls, Md	16.00	2.50

The following is a tabulation showing the total precipitation by months for the past 10 calendar years:

Total precipitation, by months, in inches.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911	2.92	1.92	2.31	2.85	0.87	4.55	4.47	7.27	2.03	4.07	3.85	3.31
1912	2.82	2.70	6.14	2.33	4.84	4.36	7.21	1.50	5.86	0.65	1.51	4.12
1913	2.85	1.37	4.67	5.86	4.55	1.81	3.24	5.42	2.41	3.37	2.20	2.29
1914	4.60	2.95	2.27	3.20	1.72	6.20	2.32	6.00	0.66	1.65	2.06	4.49
1915	6.34	3.60	1.07	0.90	2.18	6.58	3.21	7.00	1.39	3.72	0.93	2.80
1916	1.57	2.86	2.80	2.96	2.30	7.53	4.97	2.83	2.57	1.66	2.11	4.03
1917	2.57	1.97	5.12	2.17	1.84	6.26	9.41	0.77	1.31	4.81	0.53	1.47
1918	4.29	0.83	5.04	6.58	2.35	2.06	3.79	1.88	2.79	0.86	1.48	4.65
1919	3.47	2.01	4.02	3.11	5.27	3.44	6.80	3.41	1.77	3.64	2.31	3.32
1920	2.30	1.55	0.89	3.53	1.77	4.30	.....	.....	.....	.....	.....	.....
Average	2.81	1.81	2.86	2.79	2.30	3.92	3.79	3.28	1.89	2.21	1.55	2.78

TIDAL RANGE.

The automatic recording gauge located at the main sewage pumping station, on the Anacostia River, about 1½ miles above its junction with the Potomac River, indicated the fol owing for the fiscal year: Maximum high water March 26, 1920, +2.70 feet (District of Columbia datum), or 2 feet above normal; minimum low water February 27, 1920, —3.80 feet (District of Columbia datum), or 1.60 feet below normal.

The maximum range of tide for each month of the fiscal year was as follows:

Maximum monthly range of tides.

1919.	Ti 'e range in feet.	1920.	Ti 'e range in feet.
July	4.1	January	4.1
August	4.5	February	5.1
September	4.4	March	4.2
October	4.3	' pril	4.1
November	4.2	May	4.2
December	4.3	June	4.6

Studies for new areas for both storm and sanitary drainage for future development of the sewerage system were continued throughout the year; these advance studies for new trunk lines and important extensions in undeveloped areas are kept well in advance of actual cons'ruction as a means of economic and foresighted planning. For immediate construction, sanitary drainage, and separate system studies were made for new areas in Pinehurst, Connecticut Avenue Heights, Potomac Heights, Sixteenth Street Heights, and Congress Heights. In the o'der portions of Washington, where existing sewers were inadequate in size or sanitarily obsolete, studies were continued for improving the drainage system, and in the more urgent cases new sewers were constructed as far as conditions permitted. Detail construction plans were prepared for the Connecticut Avenue Heights, Illinois Avenue, Piney Branch, East Brookland trunk sewers, for the extension of the northeast boundary trunk from its present terminus to the established bulkhead line of the Anacostia River, and for the extension of the sanitary concrete cunette invert, replacing the old wood floor in the large 30-foot span Tiber sewer.

Contract plans, specifications, and proposa's were prepared for trunk sewers in Connecticut Avenue NW. between Kanawha and McKinley Streets; Thirteenth Street NW. between Spring Road and Upshur Street; Luzon Avenue between Aspen and Butternut Streets NW.; Clay Street between Thirty-fourth and Philadelphia, Baltimore & Washington Railroad NE.; Good Hope Run between Baltimore & Ohio Railroad and Minnesota Avenue SE.; Seventh Street between D and E Streets NW.; Fourth Street between Massachusetts and Maryland Avenues NE.; T Street between New Hampshire Avenue and Sixteenth Street NW.; also for service sewers in Quebec Street between Reno Road and Idaho Avenue NW.; Kennedy Street between Georgia and Colorado Avenues NW.; Douglas between Third and Fourth Streets NE.; and in Ninth Street between New York Avenue and Mount Vernon Place NW.

In connection with the sewage-disposal system, designs were prepared for special construction of the upper Potomac interceptor as far westward as the Aqueduct Bridge and for the special cons'ruction of the Anacostia main interceptor crossing under the Philadelphia, Baltimore & Washington Railroad at Benning yard. Detail plans and specifications were prepared for the superstructure of the Rock Creek pumping station and for the mechanical and electrical equipment for same. Detail plans and specifications were prepared and contract let for the construction of the electric switchboard for this station, and which provides an automatic control of the pumping units, thus reducing the expenditure for attendants to a minimum. It is anticipated that during the present fiscal year this station will be completed and placed in operation and that the upper Potomac interceptor will be constructed as far westward as College Pond. This work when completed will enable the delivery of the entire sanitary flow from the Potomac River Valley above Rock Creek to the sewage-disposal system.

The underground construction work of the public-service corporations was supervised throughout the year and all such construction accurately recorded and mapped. Details of this work are set forth under section G of this report.

The following tabulation shows the construction of the sewerage system, the average cost per mile, the funds appropriated for sewer construction, and the approximate population for each year for 20 years:

Year.	Population.	Expended for construction.[1]	Miles constructed.	Average cost per mile.
1901	284,000	$250,000.00	13.75	$18,867.92
1902	289,000	230,000.00	12.87	17,871.02
1903	294,000	170,000.00	16.42	10,353.73
1904	300,000	170,000.00	8.78	19,589.18
1905	305,000	168,650.00	11.99	14,065.89
1906	310,000	170,000.00	15.54	10,939.51
1907	315,000	333,000.00	17.09	19,485.08
1908	321,000	281,800.00	19.74	14,275.58
1909	326,000	295,500.00	18.01	14,408.66
1910	331,000	224,975.00	25.51	8,815.17
1911	341,000	219,040.00	23.18	9,449.53
1912	353,000	320,000.00	24.68	12,965.96
1913	353,000	320,000.00	23.52	13,605.44
1914	356,000	345,000.00	17.21	20,046.48
1915	359,000	385,500.00	20.54	18,622.20
1916	360,000	360,800.00	19.18	18,713.74
1917	362,000	425,000.00	14.89	28,542.71
1918	396,000	432,000.00	13.47	32,071.27
1919	450,000	432,000.00	7.98	54,135.33
1920	437,500	412,680.00	8.47	48,722.25

[1] Excluding sewage disposal system.

Recapitulation of the sewerage system and sewage-disposal system.

Sewerage system constructed during fiscal year:		
Main sewers	Miles	1.64
Pipe sewers	do	6.83
Total	do	8.47
Sewerage system (mileage in service June 30, 1920):		
Main sewers	do	149.29
Pipe sewers	do	597.02
Total	do	[1] 746.31
Sewage-disposal system constructed during fiscal year:		
Main interceptors	do	0.50
Pipe interceptors	do	.00
Total	do	0.50
Sewage-disposal system (mileage in service June 30, 1920):		
Main interceptors	do	36.63
Pipe interceptors	do	1.11
Total	do	37.74
Expended for construction during the fiscal year 1920:		
Sewerage system		$312,153.90
Sewage-disposal system		$60,545.68
Total		$372,699.58
Total mileage sewerage system and sewage-disposal system		774.05
Total expenditures for construction to June 30, 1920:		
Sewerage system		$14,726,759.00
Sewage-disposal system		$5,918,970.00
Total		$20,645,729.00

SECTION B.—OPERATION AND MAINTENANCE, SEWERAGE SYSTEM.

The maintenance work of the year included the inspection of all main trunk sewers, 147.79 miles in length, and the inspection of 898.9 miles of pipe sewers.

[1] 0.14 mile of main sewers and 0.84 mile of pipe sewers abandoned during fiscal year.

General repairs were made throughout the system on both main and pipe sewers, and their condition as to maintenance was excellent. The most important betterment was the construction of 500 linear feet of concrete invert in the 30-foot span Old Tiber sewer in Canal Street, between C and First Streets SW. Repairs were made to the concrete and brick masonry of the following important trunk sewers: Northwest boundary, Tiber Creek, Indiana Avenue and Seventh Street NW., trunk sewers. The concrete-apron rubble-stone retaining walls were extended in front of the storm-water outlet of the Piney Branch trunk sewer.

The operating work for the fiscal year included the cleaning of 23,216 storm-water catchment basins on permanently paved streets and 4,225 catchment basins on suburban streets and roads. The total amount of silt removed from the city basins was 4,980 tons and from suburban basins 3,578 cubic yards. This is an increase of 71 tons from city basins and an increase of 112 cubic yards from the amount removed from suburban basins during the preceding fiscal year. The cost of cleaning city basins, including the cost of labor and team haul, but exclusive of disposal, was $16,965.95, and the cost of cleaning suburban basins was $5,278.63, a total of $22,244.58. The average cost of cleaning city basins was $0.73 per basin, as against $0.63 per basin, and the average cost per ton of silt removed was $3.41, as against $3.58, the cost for the preceding year. The average cost of cleaning suburban basins was $1.25 per basin, as against $1.065 per basin, the cost for the preceding year, and the average cost per cubic yard of material removed was $1.475, as against $1.573, the cost for the preceding year. All material from the city basins was delivered aboard scows, removed from the city front, and deposited as fill back of the bulkhead line of the Anacostia River improvements, between Poplar Point and Giesboro Point, under permit from the United States Engineer Office. The cost of this disposal, including loading on scows, water transportation, unloading, and grading, was $6,559.50, and the average cost of this work per ton removed was $1.317, as against $1.604, the cost per ton during the preceding year.

A total of 13,803 cubic feet of material was removed from sewers and 51,759 cubic feet from the settling chamber of the sewage disposal system and 1,066,871 pounds of screenings were removed from the sewage screens and incinerated.

The following tabulation indicates the total length of sewers at the close of the fiscal year and gives the length and expenditure for 20 years for operation and maintenance, based on the total appropriation for this work, but exclusive of sewage-disposal maintenance. This tabulation indicates a reduction in annual expenditure per mile for operation and maintenance in the past 20 years from $118.67 to $84.27. This reduction in cost has been accompanied by increasingly thorough maintenance work and is solely due to developments in efficiency and economy of this important branch of the service.

Year.	Length of sewers.	Expenditure for maintenance.	Cost of maintenance per mile.	Year.	Length of sewers.	Expenditure for maintenance.	Cost of maintenance per mile.
	Miles.				*Miles.*		
1901	471.34	$50,000	$118.67	1911 [1]	589.74	$50,000	$84.70
1902	476.89	50,000	122.76	1912 [1]	618.53	50,000	80.84
1903	448.09	58,000	129.44	1913 [1]	644.28	50,000	77.61
1904	456.87	58,000	126.95	1914 [1]	661.49	50,500	76.30
1905	468.86	58,000	123.70	1915 [1]	682.11	50,000	74.03
1906	484.40	42,000	86.70	1916 [1]	702.06	50,000	71.22
1907 [1]	501.44	38,000	75.78	1917 [1]	717.38	50,000	69.69
1908 [1]	521.18	44,500	85.38	1918 [1]	730.84	50,000	68.41
1909 [1]	542.03	45,000	83.02	1919 [1]	737.93	60,000	81.31
1910 [1]	567.98	48,500	85.39	1920 [1]	747.61	63,000	84.27

[1] Exclusive of sewage-disposal system.

There are now 747.61 miles of main and pipe sewers and 6,127 catchment basins. The work of operation and maintenance includes the inspection, flushing, cleaning, and repairing of all sewers and appurtenances. The record of cost of all work performed, including comparative costs with preceding years, together with an accurate daily statement of work performed, is maintained on the card system.

The following summary gives a statement of the amount of work in this section for the fiscal year, with details of expenditure for each class of work performed:

Cleaning and repairing, fiscal year 1920.

	Work.	Cost.
Inspection of interior of all main sewers ... miles..	147.79	.....
Inspection of pipe sewers ... do....	898.90	$3,395.57
Flushing of pipe sewers ... feet..	4,746,199	
Flushing of manholes	11,794	
Flushing of storm-water receiving basins	17,449	1,067.50
Inspection and cleaning of gates, regulators, and sumps	4,270	2,496.63
Cleaning of main sewers ... feet..	8,315	2,464.09
Cleaning of pipe sewers ... do....	143,061	6,408.37
Cleaning basin outlets	73	
Cleaning of gravel basins	5	167.25
Cleaning of storm-water receiving basins:		
City basins	23,216	.....
Labor	.....	4,759.50
Teams	.....	12,206.45
Total	.....	16,965.95
County basins	4,225	.....
Labor	.....	1,967.66
Teams	.....	3,310.97
Total	.....	5,278.63
Removal by scows:		
Loader	.....	1,776.00
Transportation	.....	1,554.00
Unloader	.....	3,229.50
Total	.....	6,559.50
Total cleaning of storm-water receiving basins	.....	28,804.08
Cleaning sediment chamber	.....	2,883.51
Cleaning of screens	.....	6,124.22
Silt removed from main sewers ... cubic feet..	9,497	.....
Material removed from pipe sewers ... do....	3,668	.....
Silt removed from gravel basins ... do....	638	.....
Silt removed from storm-water receiving basins, city ... tons..	4,980.7	.....
Silt removed from storm-water receiving basins, county ... cubic yards..	3,578	.....
Silt removed from sediment chamber, main sewerage pumping station ... cubic feet..	51,759	.....
Material removed from screens at main sewerage pumping station ... pounds..	1,066,871	.....
REPAIRS.		
Relaying pipe sewers and basin connections ... feet..	311	1,278.01
Abandoning pipe sewers ... do....	2,668	164.28
Special large connections to pipe sewers	30	450.00
Repairing main sewers	.....	1,682.99
Inspection and repairs to house connections to main sewers	62	124.00
Settlements filled	21	504.35
Reconstruction of manholes	69	1,258.42
Adjusting and repairing manholes	66	1,406.23
Abandoning manholes	2	19.82
Replacing manhole frames	174	2,194.55
Replacing manhole covers	110	
Reconstructing basins	3	370.49
Adjusting and repairing basins	246	3,366.84
Abandoning basins	1	5.89
Replacing alley grates	10	269.83
Replacing alley frames	8	
Miscellaneous work	.....	1,127.07

SECTION C.—OPERATION AND MAINTENANCE, SEWAGE-DISPOSAL SYSTEM, PUMPING STATIONS, SHOPS, AND YARDS.

Under this division is included the operation and maintenance of the main pumping station, also of substations, gates, and regulators, the mechanical equipment of the sewer division, shops, stores, yards, and floating equipment, as well as the installation of mechanical apparatus and special construction.

The main sewerage pumping station was in continuous operation throughout the year, handling the sewage of practically the entire District, as well as all storm water from the 900-acre low area within the dyke lines. The va-

rious pumping services were operated without interruption and the preestablished hydraulic levels, both for sewage and storm water, were maintained without variation, both under normal conditions and throughout all storm periods. As an indication of the adequacy in design, construction, and operation works, it is to be noted that throughout the period of more than 12 years since they were put in service there has not been a single case of flooding in the 900-acre low area section within the dyke lines or the interruption for a single minute in that period of any of the various pumping services.

Main pumping station.—Sewage to the amount of 25,406,639,000 gallons and 548,900,000 gallons of storm water were pumped during the year, an increase of 17,760,000 gallons of sewage over the quantity pumped during the previous fiscal year.

The following is a tabulation of total pumpage by sewage pumps and storm water by storm-water pumps for each month of the fiscal year:

Month.	Sewage.	Storm water.	Month.	Sewage.	Storm water.
1919.			1920.		
July	2,339,966,000	54,912,000	January	2,133,905,000	12,843,000
August	2,273,209,000	35,751,000	February	1,922,183,000	47,923,000
September	2,190,791,000	18,895,000	March	2,023,394,000	62,558,000
October	2,241,600,000	56,743,000	April	2,007,164,000	103,624,000
November	2,107,928,000	35,339,000	May	1,958,605,000	9,505,000
December	2,180,082,000	44,306,000	June	2,027,812,000	76,500,000

The expenditure of coal and other supplies for the year was as follows: Coal, 14,489,715 pounds; cylinder oil, pumping engine, 1,575 gallons; gas engine, 315 gallons; engine oils, 1,942 gallons; miscellaneous oils 30 gallons; engine grease, 302 pounds; illuminating oil, 1,776 gallons; gasoline, including all usage of the department during the fiscal year, 11,347 gallons. There were 2,136 pounds of cotton waste used during the year.

Poplar Point pumping station.—The Poplar Point pumping station, located at the foot of Howard Avenue, was operated continuously throughout the year, handling all the sewage from the east side of the Anacostia River and discharging same into the main outfall of the sewage disposal system.

A total of 759,226,100 gallons of sewage was pumped during the year, an increase of 290,174,000 gallons over the quantity pumped during the previous fiscal year. The following is a tabulation of the quantities pumped during each month of the fiscal year:

Total pumpage at the Poplar Point pumping station for the year.

Month.	Gallons.	Month.	Gallons.
1919.		1920.	
July	60,665,000	January	68,012,000
August	40,976,000	February	84,103,000
September	37,517,000	March	105,729,000
October	37,581,000	Aril	89,078,000
November	48,024,000	May	61,755,000
December	71,450,000	June	54,332,000

The expenditure of coal at the Poplar Point pumping station in the combined heater and incinerator was 80,442 pounds, while 89,442 pounds of waste were removed from the screens and incinerated.

Woodridge substation.—The Woodridge substation was operated continuously throughout the year, handling all the sewage from the vicinity of Woodridge, D. C., and discharging same into the east side interceptor of the sewage-disposal system.

Sewage to the amount of 19,849,800 gallons was pumped during the year. This is an increase of 5,330,800 gallons over the quantity pumped during the previous fiscal year. The current used was furnished by the Potomac Electric Power Co., at a rate of $0.06 per kilowatt hour. The average cost of pumpage for the year was $0.86 per million foot-gallons.

The following is a tabulation of the quantities pumped during each month of the year:

Total pumpage at the Woodridge substation for the year.

Month.	Gallons.	Month.	Gallons.
1919.		1920.	
July	3,019,200	January	1,669,700
August	1,255,200	February	1,882,600
September	1,048,100	March	2,148,600
October	1,225,300	April	1,624,500
November	1,247,900	May	1,550,400
December	1,814,400	June	1,363,300

ITEMS OF REPAIR AND BETTERMENT FOR THE YEAR.

Poplar Point pumping station.—The electric equipment and pumping units were regularly inspected and necessary repairs made throughout the year. The armature on No. 2 dynamotor was rewound and the dynamotor overhauled.

Woodridge substation.—The electric equipment and pumping units were regularly inspected and necessary repairs made throughout the year. Auxiliary oilers were put on both motors and a new belt put on the oiler of No. 2 motor.

Main pumping station.—At the main pumping station a new conduit was laid to the First Street yard. The feed-water pump was overhauled and foundation rebuilt. A new four-way valve was installed on the sediment hoist. The hydraulic pressure pump was thoroughly overhauled and rebuilt. The steam drainage pump was thoroughly overhauled and rebuilt. The steam drainage pump, ventilating fan engine, hydraulic sludge press, and No. 2 generator engine condenser pump were overhauled and repaired. The low pressure crank bearing on generator engine No. 2 was rebabbitted and No. 3 condenser pump thoroughly overhauled.

Copper packing was put in the steam line to class I engines, new valves were put in the reheating coil lines to main pumps; renewed condenser pump rocker arm on engine No. 2, class I. A new 2-inch injection line was installed in the pump room and a new water line installed to thrust bearing, engine 1, class I.

In the boiler room the boiler blow-off line was repaired and partly renewed. New aprons were installed in ash pits No. 1 and No. 2, the dumping grates on boiler No. 5 were replaced, eight boiler tubes were replaced, mud-drum nipples in boiler No. 5 were replaced, the fire-brick lining in all furnaces were repaired, all boiler blow-off cocks were overhauled and repaired, and extensive repairs made to boiler steam lines.

Stores.—All supplies, construction materials, and tools purchased during the year were received, inspected, and issued at storerooms and yards. An accurate daily record was kept on the card system and a semiannual report made covering all expendable and unexpendable property. An inventory of all property is taken annually in order to verify the accounts and close the records for the year. All property, tools, and equipment unfit for further use were invoiced by the auditor's office for condemnation and sale.

Yards.—At the concrete plant in the First Street yard 146 side basin tops, 134 corner basin tops, 38 special basin tops, 217 cheek blocks, and 216 drip stones were made during the year. All silt removed from storm-water catchment basins was weighed and loaded on scows at this yard.

A new drive gear was put on the marine railway engine and repairs made on the carriage and way. The gasoline unloader was repaired, cleaned, and painted. The unloading hopper on the steam derrick was rebuilt. Minor repairs were made on the electric loader.

Ink sludge collected in the settling basins, designed and built by this department, at the Bureau of Engraving and Printing was removed and disposed of by this division. These basins have operated with the most satisfactory results in preventing stoppage of the public sewers by this troublesome waste. Prior to their construction large sums were expended in relaying sewers almost completely obstructed by these sludge deposits. The amount of this material removed and the cost of disposal is given in the following tabulation, the actual cost of the work being reimbursed by the Bureau of Engraving and Printing.

Material removed and the cost of cleaning the ink-settling basins of the Bureau of Engraving and Printing.

Date of cleaning.	Tons removed.	Unit cost removal per ton.	Unit cost team haul per ton.	Unit cost transportation and disposal per ton.	Total cost removal, transportation per ton.	Total cost removal and disposal.
1919.						
July 11	36.6	$2.52	$1.38	$1.26	$3.76	$151.51
Aug. 14	37.7	2.35	1.23	1.26	3.55	147.29
Sept. 24	43.5	2.31	1.12	1.24	3.51	168.07
Oct. 30	39.6	2.03	.90	1.20	3.14	136.68
Dec. 30	38.1	1.93	1.13	(1)	2.81	118.12
1920.						
Jan. 29	42.1	1.79	.85	(1)	2.04	94.63
Feb. 26	40.0	1.81	1.13	(1)	2.78	121.69
Mar. 11	35.1	2.06	1.32	(1)	2.80	109.23
Apr 15	39.5	2.29	1.17	1.34	3.57	153.52
May 27	45.7	2.00	1.01	1.28	3.18	159.98
June 24	37.2	2.41	1.22	1.34	3.70	151.75
Total and average	435.1	2.14	1.13	1.27	3.17	1,512.47

[1] Disposed of as filling in James Creek Canal.

Floating equipment.—The floating equipment was engaged in transporting materials removed from the sediment chamber and from storm-water catchment basins throughout the city to their points of disposal; in conveying construction materials to points along the water front, where sewer work was in progress; also in the transportation of chemists in connection with the sanitary survey of the Potomac River, and in the transportation of assistant engineers and inspectors. The towboat *Virginia* was thoroughly overhauled, repaired, and painted. A new steady bearing was put on the propeller shaft and lag screws on the rear stuffing box were replaced with bolts. The steel gear on the cam shaft drive was replaced with a rawhide gear. The steam dredge was repaired, painted, and the spud replaced. Minor repairs were made on the launch and five scows.

Shops.—In addition to the work of this division, enumerated in preceding paragraphs, the work of the shops included all repairs to pumping and other machinery, cleaning and painting wagons, motor trucks and construction equipment, minor repairs for maintenance and betterment of buildings, and the maintenance of electric lighting and power circuits. Eighteen basin cleaning wagons, 2 hose reels, 16 wagons, 1 tool wagon, and 32 basin cleaning tanks were repaired; also 9 wagons, 2 hose reels, 2 carts, and 2 basin cleaning tanks were thoroughly overhauled and painted. Six autos were repaired and 2 auto trucks cleaned and painted. Small tools were made as follows: Fifty-two cold chisels, 16 scrapers, 230 steel points for picks, 26 bush-hammer blades, 24 drills, 17 bull points, 10 lathe tools, 6 wrenches, 6 blacksmith tongs, 12 cold cutters, 4 riveting tools, 2 hammers, 2 caulking irons, 3 hooks, 3 pipe clamps, 2 nail pullers, 21 signs, and 9 miscellaneous tools. Small tools were repaired as follows: Three hundred and five chisels, 92 cold cutters, 4 wrenches, 8 tongs, 525 bull points, 174 drills, 2,891 picks, 88 saws, 31 cutters, 10 crowbars, 26 mattocks, 29 punches, 17 lathe tools, and 42 miscellaneous tools.

MISCELLANEOUS CONSTRUCTION.

New tide gates were made and installed on the New Jersey Avenue and B Street trunk sewer and for the Tiber Creek and New Jersey Avenue trunk sewer. Gates and valves were cleaned and painted at the Boulder Bridge crossing gatehouse over the Rock Creek main interceptor. At the Rock Creek pumping station forms were made for the inlet connection of the upper Potomac interceptor, for the discharge conduit, clean-out tunnel, and entrance steps. Forms were made for 10 construction and repair jobs.

MISCELLANEOUS WORK.

Repairs were made to the various sewer department wharves and flooring renewed at the wharf for the electric loader. New engine housing was built for

the gasoline unloader; also the marine railway was repaired and a new gasoline engine installed. New engine housing was built and general repairs made to the portable steam derrick.

The parking and roadways around the main station were repaired and improved during the year.

SECTION D.—CONSTRUCTION, SEWERAGE SYSTEM.

The following is a statement of the length of sewers constructed during the year and the cost of same as aggregated for the several construction districts:

Section.	Length.	Cost.
	Feet.	
1. County west of Rock Creek	12,766	$39,121.83
2. County east of Rock Creek	15,850	113,497.01
3. County west of Anacostia River	5,421	22,179.31
4. County east of Anacostia River	3,563	68,126.03
5. Washington City	7,234	72,498.61

The following is a detailed statement of sewers constructed in the various districts:

Western district (county west of Rock Creek).—In this area 1,747 linear feet of trunk sewers, 182 linear feet of service mains, and 13,221 linear feet of service sewers, a total of 15,150 linear feet, were constructed, as follows: Chevy Chase, 3,832 linear feet of service sewers; Tenleytown, 4,487 linear feet of service sewers; Cleveland, 1,356 linear feet of service sewers; Arizona, 2,191 linear feet of service sewers; Woodley, 900 linear feet of service sewers; Georgetown, 1,747 linear feet of trunk sewers, 182 linear feet of service mains, and 455 linear feet of service sewers, a total of 2,384 linear feet. Twenty-three storm-water receiving basins were constructed in this district during the year and six basins were abandoned.

Contract was let and work begun on the construction of the Connecticut Avenue Heights trunk sewer, in Connecticut Avenue, between Kanawha and McKinley Streets NW.

Central district (county east of Rock Creek).—In this area 2,913.40 linear feet of trunk sewers, 920.58 linear feet of service mains, and 12,016.04 linear feet of service sewers, a total of 15,850.02 linear feet, were constructed, as follows: Takoma, 2,119.90 linear feet of trunk sewers, 376.40 linear feet of service mains, and 3,256.51 linear feet of service sewers, a total of 5,752.81 linear feet; Brightwood, 793.50 linear feet of trunk sewers and 2,705 linear feet of service sewers, a total of 3,498.50 linear feet; Petworth, 345.68 linear feet of service mains and 3,966.80 linear feet of service sewers, a total of 4,312.48 linear feet; Mount Pleasant, 1,114.03 linear feet of service sewers; Washington Heights, 198.50 linear feet of service mains and 973.70 linear feet of service sewers, a total of 1,172.20 linear feet.

Contract was let for the construction of the Spring Road relief sewer in Thirteenth Street, between Spring Road and Upshur Street NW.

Work was completed on the construction of the Luzon Avenue trunk sewer between Aspen and Butternut Streets NW., the Piney Branch trunk sewer from Georgia to Illinois Avenue, and on the Upper Piney Branch trunk sewer from Third and Aspen Streets to Fourth and Butternut Streets NW. Ninety-five storm-water receiving basins were constructed and 16 basins reconstructed in this district during the year.

Eastern district (county west of the Anacostia River).—In this area, north of Florida Avenue, between North Capitol and the Anacostia River, 70.50 linear feet of trunk sewers, 8.50 linear feet of service mains, and 5,844.65 linear feet of service sewers, a total of 5,423.65 linear feet, were constructed as follows: Eckington, 2,958.43 linear feet of service sewers; Brookland, 70.50 linear feet of trunk sewers and 1,305.72 linear feet of service sewers, a total of 1,376.22 linear feet; Trinidad, 8.50 linear feet of service mains and 50 linear feet of service sewers, a total of 58.50 linear feet; Langdon, 1,030.50 linear feet of service sewers. Ten storm-water catchment basins were constructed in this district during the year.

The following special work was done during the year: The construction of a special junction chamber at the present terminus of the Michigan Avenue trunk sewer at Eleventh Place and Randolph Street NE.

Eastern district (county east of the Anacostia River).—In this area, east of the Anacostia River, 2,088.35 linear feet of trunk sewers and 1,724.08 linear feet of service sewers, a total of $3,812.43 linear feet were constructed as follows: Kenilworth, 206.60 linear feet of service sewers; Bennings, 916.35 linear feet of trunk sewers; Anacostia, 1,172 linear feet of trunk sewers and 1,517.48 linear feet of service sewers, a total of 2,689.48 linear feet. Six storm-water receiving basins were constructed in this district during the year.

Work was completed on the construction of the Good Hope Run trunk sewer between the Baltimore & Ohio Railroad and Minnesota Avenue SE.

Contract was let and work begun on the construction of the Scaggs Branch trunk sewer, between Thirty-fourth Street NE. and the Philadelphia, Baltimore & Washington Railroad.

Washington City district.—In this area 3,464 linear feet of trunk sewers and 3,419.30 linear feet of service sewers, a total of 6,883.30 linear feet, were constructed as follows: Northwest section, 445 linear feet of trunk sewers and 2,856.80 linear feet of service sewers, a total of 3,301.80 linear feet; northeast section, 1,573 linear feet of trunk sewers; southeast section, 1,446 linear feet of trunk sewers and 278.50 linear feet of service sewers, a total of 1,724.50 linear feet; southwest section, 238.50 linear feet of service sewers. Forty-one storm-water receiving basins were constructed, 20 reconstructed, and 2 abandoned in this district during the year.

Contracts were let and work completed on the construction of the T Street trunk sewer between New Hampshire Avenue and Sixteenth Street; the Ninth Street NE. relief sewer between Maryland Avenue and Massachusetts Avenue; the Twelfth Street SE. relief sewer between Pennsylvania Avenue and C Street; and concrete invert in the 30-foot span Old Tiber sewer in Canal Street SW., between C and First Streets. Contracts were let and work begun on the construction of the Fourth Street NE. section of the Maryland Avenue trunk sewer and for the reconstruction of the Seventh Street trunk sewer in Seventh Street NW., between D and E Streets.

SEWAGE DISPOSAL SYSTEM.

Anacostia main intercepting sewer.—The contract for the construction of section 11, comprising 249.35 linear feet of 4-foot 6-inch by 5-foot brick and concrete sewer, located at the south end of the Benning yard and crossing under tracks of the Philadelphia, Baltimore & Washington Railroad, was placed under contract and completed during the year. Section 11–A, comprising 217 linear feet of 4-foot 6-inch by 4-foot 6-inch brick and concrete sewer and crossing Scaggs Branch on pile and timber platform was constructed by day labor. This platform was constructed during the preceding fiscal year. Contract was let and work completed on the construction of section 12 of this interceptor. This work consisted in the construction of 208 linear feet of 4-foot 6-inch by 4-foot 6-inch brick and concrete sewer, extending along the east shore of the Anacostia River between Scaggs Branch and Benning Road. This construction completed the construction of this important interceptor from Poplar Point to a point within 400 feet of Benning Road, a distance of 5 miles in length.

Upper Potomac intercepting sewer.—Work was completed on the construction of section 2 of this interceptor, comprising 2,509 linear feet of 4-foot diameter brick and concrete sewer extending along Water from Twenty-ninth to Thirty-fourth Streets NW. In connection with this work three special 48-inch diameter cast-iron pipes were laid over mill races crossing the line of this interceptor; also a special outlet was constructed for the mill race at Potomac Street and a spillway constructed at this point. The Potomac Street trunk-sewer outlet was reconstructed crossing Potomac Street to clear the line of construction of the interceptor crossing same. Contract was let and work compleed on the construction of section 3, comprising the construction of 800 linear feet of 4-foot diameter brick and concrete sewer and extending as far as the Aqueduct Bridge.

The substructure for the Rock Creek pumping station, including the construction of by-pass connection for the intercepting sewer, discharge conduit, and clean-out tunnel was completed during the year. Plans were prepared and contract let for the construction of the superstructure of this pumping station.

Length of main sewers and pipe sewers and the number of storm-water receiving basins constructed during the fiscal year ending June 30, 1920.

Appropriation.	Main sewers.	Pipe sewers.	Storm water receiving basins.
	Linear feet.	*Linear feet.*	
Main and pipe sewers	3,464.00	3,067.20	11
Suburban sewers	5,366.70	5,954.08	118
Assessment and permit sewers		25,184.63	
Sewage disposal system	1,996.35		
Miscellaneous trust-fund deposits	450.00	1,590.94	29
Miscellaneous appropriations			1
Total	11,277.05	35,796.85	175

Section E.—Maps, Records, and Drafting.

Work was continued during the year on the 10 feet=1 inch scale maps, showing all underground construction, vaults, building projections, curb, and street railway tracks. Four such maps were completed during the year.

Drainage plats were prepared for 134 engineer department files and 57 plats were prepared for main and pipe sewers and receiving basins, also 50 plats showing assessment on account of connections from parcel property to public sewers. Forty miscellaneous plats involving sewer construction and changes were made during the year.

Six new record maps have been made during the year. The work of posting current sewer construction on these maps was kept up to date as well as of new streets and alleys and much missing data of old work plotted from field surveys.

The countertracings for use of the public for information have been kept posted to date with current construction as well as newly established or modified street grades. Four badly worn sheets were replaced by new ones.

The 100-foot scale drainage study maps for the suburban portions of the District have been kept posted to date with current construction as well as with newly established or modified street grades and new subdivisions. In addition, 16 old and badly worn maps have been replaced by new ones.

One hundred and sixty cards showing assessment pending for future sewers have been made, and 85 engineer department files, inclosing plats showing the construction of service sewers abutting assessable property have been forwarded through the chief clerk, engineer department, to the assessor. Five letters have been forwarded to the health officer with plats as notice of newly constructed service sewers abutting existing houses.

The card index of newly made subdivisions has been kept posted to date, 40 having been added. In addition to this index record, these subdivisions are posted on record maps, record made, and plats made for the assessor upon subdivision of parcel property where same abuts service sewers in order that the proper special assessment may be levied.

Permits were granted for the connection of 19 areaway drains to separate system sewers. These areas were inspected and a card index of same kept posted to date.

One hundred and sixty new grade sheets for work constructed during the year have been filed and 18 old and badly worn sheets have been replaced.

Twenty-nine paving schedules of the surface division, covering 255 paving jobs, were examined, and where necessary, plats prepared for construction, reconstruction, or abandoning of sewers in advance of paving.

Twenty-two surface-division grade maps, involving the establishment of new street grades, and 28 grade maps involving modifications of existing approved grades have been studied with reference to the effect on the drainage system.

Plans, estimates, proposals, and specifications have been prepared for the construction of sewers under 18 contracts. Fifty-three measurement sheets for work under contract have been checked and copies of each filed for future reference.

Twenty-two plats and deeds for rights of way have been prepared in connection with the extension of the public sewerage system, and all of same have been acquired and recorded. These are listed in Table 16, appended to this report.

Work has been continued on the elimination of privies, and a card index kept posted of every privy maintained in the District. Permits were issued by the health officer for the erecton of 53 new privies.

One hundred and thirty miscellaneous engineer department files were studied and reported upon.

SECTION F.—RECORDS AND ACCOUNTS.

The work of this division included the preparation of requisitions and vouchers, records of costs of construction, cost keeping, preparing pay rolls, and material and equipment accounting. During the year 1,007 construction jobs, 7,570 foremen's reports, 40,357 card records, 1,140 supply bills, 499 pay rolls, 265 requisitions, 233 transfer and refund vouchers, 575 engineer department files, 149 letters, and 29,518 miscellaneous reports were handled. The following financial statements of the various sewer appropriations and expenditures from special funds gives a résumé of the operations for the year. The total of these expenditures was $779,679.77.

Sewerage system.

Cleaning and repairing sewers and basins:		
Appropriation	$80,000.00	
Deficiency	5,000.00	
		$85,000.00
Expended—		
Mechanics, laborers, and watchmen	41,444.12	
Drivers and gate tenders	18,391.42	
Inspectors and other per diem employees	5,062.32	
Construction material and tools	1,181.07	
Repairs to equipment, equipment and supplies	265.77	
Paid engineer department stables for forage, blacksmith work, etc	8,450.65	
Paid purchasing office for salaries	799.49	
Paid surface division for repaving work	286.12	
		84,880.96
Unexpended balance		119.04
Maintenance and operation, sewage-pumping service:		
Appropriation	75,000.00	
Deficiency	15,000.00	
		90,000.00
Expended—		
Mechanics, laborers, and watchmen	28,000.34	
Coal, oil, waste, and other supplies	52,047.75	
Tools and equipment renewals	9,891.39	
		89,939.48
Unexpended balance		60.52
Main and pipe sewers and receiving basins:		
Appropriation, 1920	107,000.00	
Reappropriated, 1919	35,189.90	
Reappropriated, 1918	506.96	
		142,696.86
Expended—		
Contract construction	62,511.33	
Day-labor construction	25,834.82	
Construction material and tools	19,239.85	
Inspectors and other per diem employees	12,305.44	
Paid surface division for repaving work	1,644.81	
Paid purchasing office for salaries, etc	2,947.23	
Paid disbursing office for salaries	395.00	
Paid corporation counsel's office for salaries	253.53	
Paid engineer department stables for overhead charges	270.00	
Outstanding contracts and material to complete same	17,000.00	
		142,402.01
Unexpended balance		294.85

Suburban sewers:		
Appropriation, 1920	$110,000.00	
Reappropriated, 1919	112,672.29	
Reappropriated, 1917	35,761.13	
		$258,
Expended—		
Contract construction	132,746.01	
Day-labor construction	46,976.22	
Construction material and tools	17,186.34	
Inspectors and other per diem employees	14,178.35	
Paid surface division for repaving work	302.61	
Paid purchasing office for salaries	2,015.52	
Paid disbursing office for salaries	395.00	
Paid engineer department stables for overhead charges	273.34	
Outstanding contracts and material to complete same	44,300.00	
		258,
Unexpended balance		
Assessment and permit work, sewers:		
Appropriation, 1920	$50,000.00	
Reappropriated, 1919	11,062.41	
Reappropriated, 1918	11,038.11	
Reappropriated, 1916	1,388.86	
		73,
Expended—		
Contract construction	8,060.86	
Day-labor construction	50,375.84	
Construction material and tools	7,308.14	
Inspectors and other per diem employees	4,558.07	
Paid surface division for repaving work	1,288.68	
Paid purchasing office for salaries, etc	1,477.18	
Paid engineer department stables for overhead charges	140.00	
Paid disbursing office for salaries	197.50	
		73
Unexpended balance		
Miscellaneous trust-fund deposits, District of Columbia:		
Amount received from various depositors, fiscal year 1920		15
Balance brought forward from fiscal year 1919		1
		16
Expended—		
Contract construction	$2,403.19	
Day-labor construction	4,743.67	
Construction material and tools	1,843.56	
Paid surface division for repaving work	465.65	
Contingent charges for engineering, supervision, wear of tools, etc	824.07	
		10
Inspection and engineering, cleaning, and repairing—		
Cleaning garage traps	940.40	
Inspection of vaults	4.00	
Inspection of private air pipe lines	32.00	
Returned to depositors		5
Total		16

Construction from miscellaneous appropriations:		
Repayments		$17,487.76
Expended—		
Construction—		
Day-labor construction	$9,118.14	
Construction material	4,411.11	
Paid surface division for repaving work	36.42	
Contingent charges for supervision, engineering, wear of tools, etc	676.69	
		14,242.36
Inspection, cleaning, repairing, and other work—		
Inspection and repairs to trunk-sewer connections from houses	58.00	
Special large-size connections	480.00	
Adjusting basins and manholes in connection with surface division work	246.56	
Cleaning Bureau of Engraving and Printing ink basins	1,362.40	
Erection and removal of rope barricades from Peace Monument to Seventeenth Street NW., in connection with maintenance of public order (parade of First Division, United States Army, and Peace Parade celebration)	794.41	
Roping portion of ellipse adjacent to White House grounds for Fourth of July celebration	62.10	
Pumping storm water from flooded underground tunnel of central heating, lighting, and power plant	79.79	
Rental of sewer department marine railway for dry-docking vessels to various depositors	162.00	
		3,245.26
Total		17,487.62
Purchase and condemnation of land for rights of way for sewers:		
Appropriation		2,000.00
Expended—		
Cost of rights of way, titles, and recorder fees		415.55
Unexpended balance		1,584.45

Summary of expenditures, sewerage system.

Cleaning and repairing, 1920	84,880.96
Sewage pumping service, 1920	89,939.48
Main and pipe sewers, 1920	[1] 125,402.01
Suburban sewers, 1920	[1] 214,073.39
Assessment and permit work, 1920	[1] 73,406.27
Permit work, 1920	218.33
Miscellaneous trust-fund deposits, 1920	11,256.54
Miscellaneous appropriations, 1920	17,487.62
Condemnation, 1920	415.55
Outstanding contracts:	
Main and pipe sewers, 1920	17,000.00
Suburban sewers, 1920	44,300.00
Total	678,380.15

[1] Includes reappropriated from prior years expended in 1920.

The following are payments into the Treasury on account of assessment and service sewers under the appropriations indicated below during the fiscal year 1920:

Assessment and permit-work sewers		$50,382.23
Suburban sewers		173.11
Total		50,555.34

Sewage-disposal system.

Upper Potomac interceptor:		
Appropriation		$59,000.00
Expended—		
Contract construction	$12,288.23	
Day-labor construction	14,526.19	
Construction material and equipment	8,282.82	
Paid surface division for repaving	1,526.14	
Paid purchasing office for salaries, etc	375.54	
		36,998.92
Unexpended balance		22,001.08
Sewage treatment works:		
Unexpended balance from fiscal year 1919		39,639.40
Anacostia main interceptor:		
Appropriation [1]		18,300.20
Expended—		
Contract construction	$17,582.05	
Day-labor construction	208.03	
Inspectors and other per diem employees	468.00	
Miscellaneous supplies	11.52	
		18,269.60
Unexpended balance		30.60

Summary of expenditures, sewage-disposal system.

Upper Potomac interceptor, 1920	$36,998.92
Upper Potomac interceptor, 1919	22,639.73
Upper Potomac interceptor, 1918	22,982.37
Anacostia main interceptor, 1920 [1]	18,269.60
	100,890.62

Total expenditures.

Sewerage system	$677,964.60
Sewage-disposal system	100,890.62
Purchase and condemnation of land for rights of way	415.55
Purchase of land for sewage treatment works	409.00
Total expenditures during fiscal year 1920	779,679.77

[1] Reappropriation balances from 1916 and 1917.

nt of expenditures under allotments made to other departments from sewer appropriations, fiscal year 1920.

Appropriations.	Engineer stables.	Purchasing officer, salaries of inspectors and laborers at property yard, and maintenance of sand wharf.	Disbursing office.	Corporation counsel's office.	Total.
nents	$1,048.06	$7,614.96	$987.50	$253.53	$9,094.05
g and repairing	427.70	113.86			
ad pipe	253.90	1,625.80	337.50	253.53	
an sewers	100.98	1,887.32	293.30		
nent and permit work	104.10	1,450.59	350.00		
Potomac interceptor		190.67			
l expenditures	886.68	5,268.24	980.80	253.53	7,389.25

nt of expenditures under allotments from outside departments to sewer department during fiscal year 1920.

nt expenses:

l allotment	$1,200.00
enditures, stationery, printing, and supplies	1,198.00
nexpended balance	2.00

tement of expenditures for per diem employees, fiscal year 1920.

and repairing	$3,364.58
pumping service	1,061.50
d pipe	11,098.83
n sewers	12,912.39
ent and permit work	3,584.31
a main interceptor	468.00
otomac interceptor	881.50
otal	33,371.11

following is a statement of the unexpended balances of the principal construction appropriations for 1901 to 1920, in-

:

Fiscal year.	Main and pipe sewers.	Suburban sewers.	Assessment and permit sewers.	Total.
	$1,656.53	$2,237.61		$3,894.14
	2,610.75	6,745.80		9,356.55
	3,948.39	5,762.88		9,711.27
	268.70	2,072.54		2,341.24
	5,676.05	6,926.46		12,602.51
	7,177.09	4,798.30		11,975.39
	255.68	11,038.27		11,293.95
	3,878.93	815.05		4,693.98
	678.12	570.80		1,248.92
	622.34	4,486.94		5,109.28
	489.36	401.36		890.72
	3,716.32	791.12		4,507.44
	119.82	13.36	$118.16	251.34
	83.43	1,316.55	134.65	1,534.63
	37.00	441.18	3,785.50	4,263.68
	17.65	20.00	3,673.75	3,711.40
	127.73	302.42	1.38	431.53
	75.88	3,798.94	4,411.66	8,286.48
	34,336.74	70,769.24	16,474.43	121,580.41
	294.85	60.03	83.11	437.99
	66,071.36	123,368.85	28,682.64	218,122.85

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Statement of expenditures under allotments made to other departments from sewer appropriations, fiscal year 1920.

Appropriations.	Engineer stables.	Purchasing officer, salaries of inspectors and laborers at property yard, and maintenance of sand wharf.	Disbursing office.	Corporation counsel's office.	Total.
Total allotments	$1,048.06	$7,614.96	$987.50	$253.53	$9,094.05
Expended:					
Cleaning and repairing	427.70	113.86			
Main and pipe	253.90	1,625.80	337.50	253.53	
Suburban sewers	100.98	1,887.32	293.30		
Assessment and permit work	104.10	1,450.59	350.00		
Upper Potomac interceptor		190.67			
Total expenditures	886.68	5,268.24	980.80	253.53	7,389.25

Statement of expenditures under allotments from outside departments to sewer department during fiscal year 1920.

Contingent expenses:

Total allotment	$1,200.00
Expenditures, stationery, printing, and supplies	1,198.00
Unexpended balance	2.00

Statement of expenditures for per diem employees, fiscal year 1920.

Cleaning and repairing	$3,364.58
Sewage-pumping service	1,061.50
Main and pipe	11,098.83
Suburban sewers	12,912.39
Assessment and permit work	3,584.31
Anacostia main interceptor	468.00
Upper Potomac interceptor	881.50
Total	33,371.11

The following is a statement of the unexpended balances of the three principal construction appropriations for 1901 to 1920, inclusive:

Fiscal year.	Main and pipe sewers.	Suburban sewers.	Assessment and permit sewers.	Total.
1901	$1,656.53	$2,237.61		$3,894.14
1902	2,610.75	6,745.80		9,356.55
1903	3,948.39	5,762.88		9,711.27
1904	268.70	2,072.54		2,341.24
1905	5,676.05	6,926.46		12,602.51
1906	7,177.09	4,798.30		11,975.39
1907	255.68	11,038.27		11,293.95
1908	3,878.93	815.05		4,693.98
1909	678.12	570.80		1,248.92
1910	622.34	4,486.94		5,109.28
1911	489.36	401.36		890.72
1912	3,716.32	791.12		4,507.44
1913	119.82	13.36	$118.16	251.34
1914	83.43	1,316.55	134.65	1,534.63
1915	37.00	441.18	3,785.50	4,263.68
1916	17.65	20.00	3,673.75	3,711.40
1917	127.73	302.42	1.38	431.53
1918	75.88	3,798.24	4,411.66	8,286.48
1919	34,336.74	70,769.24	16,474.43	121,580.41
1920	294.85	60.03	83.11	437.99
Total	66,071.36	123,368.85	28,682.64	218,122.85

Division G.—Public-Service Corporations.

This special work assigned to the division of sanitary engineering involves detailed determination of locations for new extensions of gas mains, electric, telephone, and telegraph conduits and their accessories as well as methodic supervision of the work done under permits therefor and the accurate location of all work. Applications for these new constructions require careful location studies to avoid interference with existing and future construction, and particularly to assure economical and orderly occupation of the public space along predetermined systematic lines. During construction the work is regularly inspected, and compliance with the terms of the permit is insisted upon, and an accurate record of the location of all work is obtained from field measurements. Record sheets are prepared showing the work in detail, and the work is then plotted on record maps and recorded on card system.

The work for the year may be summarized as follows:

Permits prepared upon application	2,162
New record cards made	2,162
New jobs inspected and recorded on sheet	1,771
Inspections of work under construction	3,234
Daily average jobs under construction	48
New gas mains laid, miles	5.74
Electric duct laid, miles	68.60
Manholes constructed	1,102
Drains from manholes and railway tracks	51
Houses connected with gas mains	832
Houses connected for electric light and power	1,594
Private pipe lines:	
Permits prepared for gasoline and compressed-air pipes	32
Inspected, located, and plotted	18
Private vaults in public space:	
Applications approved	12
Inspected, located, and recorded	5

WATER DEPARTMENT CONNECTIONS TO THE SEWERAGE SYSTEM.

There were 45 permits issued the water department for drains from fire hydrants, blow-offs, air valves, and watering troughs, and 24 inspected and recorded.

Certification of noninterference with existing underground construction of record was made in connection with eight conduits constructed by the electrical department.

In addition to the current work of the year much data was collected as to the location of unrecorded mains and conduits, but a large amount still remains to be done.

Statement of expenditures for supervision, inspection, and record on account of underground construction, public-service corporations, and the amounts charged to each of the several corporations for the fiscal year 1920.

Expenditures:	
Supervision	$1,070.00
Inspection	2,151.98
Record	202.70
Total	3,424.68
Charged as follows:	
Potomac Electric Power Co	1,496.32
Chesapeake & Potomac Telephone Co	715.90
Washington Gas Light Co	716.12
Georgetown Gas Light Co	101.72
Washington Railway & Electric Co	2.00
Capital Traction Co	392.62
Total	3,424.68

Recapitulation of underground structures of the public-service corporations.

Constructed during the fiscal year 1920:		
Electric conduit	linear feet	80,511
Electric duct	do	362,214
Gas mains	do	30,337
Total lengths constructed 1900 to 1920:		
Electric conduit	do	2,236,337
Electric duct	do	10,838,956
Gas mains, 1907 to 1920	do	862,426

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TABLE NO. 1.—*Sewerage system contract construction, fiscal year 1920.*

Contract No.	Length.	Constructed size.	Total cost.	Appropriation.	Contractor.
	Feet.				
6199	1,172.00	6 feet by 6 feet	$10,700.88	Suburban, 1920	W. F. Brenizer Co.
	715.00	9 feet 3 inches.			
6266	78.50	9 feet 3 inches, invert.	5,868.22	Suburban, 1917-1920	Do.
	491.40	7 feet.			
6705	818.70	8 feet	41,979.13	Suburban, 1919	Wm. F. Cush.
	49.70	18 inches.			
	357.30	3 feet 6 inches.			
6768	431.70	3 feet	11,342.96	Suburban, 1920	George Hyman.
	1,373.00	3 feet 3 inches.			
6785	200.00	3 feet [1]	27,418.31	Main and pipe, 1920	W. F. Brenizer Co.
6786		(1)	17,937.78	do	Do.
6796		(2)	26,013.57	Suburban, 1920	George Hyman.
	535.00	3 feet.			
6799	459.00	4 feet [1]	21,141.23	do	Do.
	444.65	15 inches.			
6879	406.50	10 inches	4,248.85	Assessment and permit, 1920.	W. F. Brenizer Co.
6887	1,261.00	10 inches [1]	5,164.08	do	George Hyman.
6889	298.10	10 inches	2,957.48	Whole cost main and pipe, 1920.	Wm F. Cush.
6890	497.75	29.5 feet wide, concrete invert.	8,185.75	Main and pipe, 1920	W. F. Brenizer Co.
	459.28	15 inches.			
6891	905.50	12 inches	6,737.57	Suburban, 1920	Do.
	46.50	3 feet 6 inches.			
6912	389.50	3 feet [1]	9,763.76	Main and pipe, 1920	Do.
6922		(2)		do	Adam McCandlish.
6938		(2)		Suburban, 1920	W. F. Brenizer Co.
6941		(3)		Main and pipe, 1920	Adam McCandlish.
	11,390.08		199,459.57		

[1] Repaving not reported. [2] Work not completed. [3] To be done in 1921.

TABLE No. 2.—*Sewage disposal-system contract construction, fiscal year 1920.*

Contract No.	Section.	Total cost.	Appropriation.	Contractor.
6281	Upper Potomac interceptor section No. 2.	$13,918.03	Upper Potomac interceptor, 1918.	W. F. Brenizer Co.
6518	Upper Potomac interceptor section No. 3.	29,285.68	.....do.....	Do.
6707	Substructure, Rock Creek pumping station.	24,872.91	Upper Potomac interceptor, 1919.	Do.
6885	Anacostia main interceptor section No. 11.	14,073.08	Anacostia main interceptor, 1920.	Wm. F. Cush.
6936	Anacostia main interceptor section No. 12.	(1)	.....do.....	W. F. Brenizer Co.
		82,149.70		

[1] To be done in 1921.

TABLE No. 3.—*Sewer construction under permit system from the appropriation for assessment and permit work for the fiscal year 1920.*

Order No.	Location.	Length.	Size.	Amount of deposit.	Cost. To District of Columbia.	Cost. To depositor.	Total cost.	Amount returned.	For whom done.
		Feet.	*In.*						
1	East and west of alley of square No. 630.	145.30	12	$450.00	$135.03	$135.03	$270.06	$179.94	Duncan Candler.
2	Kalorama Road NW. crossing Twenty-third Street.	40.00	12	125.00	83.30	83.30	[1]166.60	.....	Hornblower & Marshall.
		185.30	....	575.00	218.33	218.33	436.66	.....	

[1] Repaving not reported.

TABLE No. 4.—*Sewer construction under the assessment system from the appropriation for assessment and permit work for the fiscal year 1920.*

Order.	Length.	Size.	Total cost.	Order.	Length.	Size.	Total cost.
	Feet.	*Inches.*			*Feet.*	*Inches.*	
100	(1)	.....	$197.20	121	59.00	12	$415.89
101	381.00	10	896.12	122	291.00	12	1,313.13
102	400.00	10	1,512.71	123	350.00	12	1,178.97
	65.23	10		124	200.00	12	1,012.74
103	115.00	12	508.65	125	80.00	15	327.04
104	12.00	10	140.93	126	213.40	12	963.68
105	160.00	10	316.75		49.00	12	
106	322.25	10	1,045.42	127	53.50	10	362.07
107	392.75	10	927.10	128	213.70	10	546.20
108	226.00	10	514.70	129	170.35	10	499.94
109	400.00	10	1,258.68	130	251.70	12	771.84
110	353.00	10	1,124.61	131	300.40	12	805.42
111	161.27	10	610.92	132	302.00	12	1,002.19
112	125.00	12	397.35	133	348.00	12	1,087.16
113	298.00	10	679.51	134	343.50	12	1,013.95
114	100.00	10	391.23	135	216.50	10	639.50
115	(2)	.....	.....	136	(2)	.....	.....
116	300.00	10	687.56	137	306.38	10	879.77
117	258.00	10	616.31	138	225.00	10	794.86
118	184.00	10	509.93	139	274.00	10	580.04
119	365.40	12	1,182.12	140	62.59	10	266.60
120	235.00	12	720.60	141	167.00	12	473.98

[1] One manhole. [2] Canceled.

No. 4.—*Sewer construction under the assessment system, etc.*—Continued.

Order.	Length.	Size.	Total cost.	Order.	Length.	Size.	Total cost.
	Feet.	*Inches.*			*Feet.*	*Inches.*	
.....	162.33	12	$504.56	175	157.46	10	$536.51
.....	250.00	12	813.09	176	436.60	10	1,395.96
.....	211.40	12	688.00	177	362.00	10	920.64
.....	197.00	10	567.57	178	150.00	12	1,071.91
.....	12.00	12	162.02	179	60.70	10	275.07
.....	200.00	10	587.92	180	233.00	10	606.34
.....	197.00	12	540.72	181	163.50	10	575.28
.....	295.00	12	794.33	182	488.30	15	2,470.36
.....	355.00	10	826.53	183	317.00	12	1,125.39
.....	195.00	10	608.60	184	223.00	12	883.93
.....	247.25	12	644.17	185	198.00	10	473.44
.....	160.10	10	559.62	186	183.00	10	606.60
.....	108.50	12	379.67	187	62.00	10	157.91
.....	161.26	12	465.54	188	29.00	10	161.92
.....	95.10	10	306.97	189	665.00	10	1,777.42
.....	60.00	10	431.72	190	206.60	12	1,250.75
.....	52.57	15	255.90	191	330.00	12	760.10
.....	320.00	10	764.74	192	200.00	10	552.19
.....	190.00	10	464.37	193	151.70	10	430.18
.....	231.00	10	1,038.25	194	144.00	10	417.99
.....	50.00	12	165.71	195	58.00	12	140.60
.....	59.50	10	137.75	196	60.00	10	142.09
.....	319.40	12	835.32	197	395.00	10	868.26
.....	390.60	10	860.80	198	(2)	.....	.....
.....	(2)	.....	.....	199	396.00	10	544.73
.....	294.00	10	906.55	200	195.00	18	943.83
.....	205.10	12	557.58	201	194.65	15	826.66
.....	(2)	.....	.....	202	320.00	8	[3] 1,687.93
.....	(2)	.....	.....		219.00	10	
.....	136.80	12	511.36	203	177.00	10	[3] 403.88
.....	345.60	10	754.80				
.....	594.00	10	2,221.67		22,547.94	.....	70,504.18
.....	361.00	10	967.16				

[2] Canceled.

[3] Repaving not reported.

No. 5.—*Basin construction from the appropriation for main and pipe sewers, fiscal year 1920.*

Order.	Basins.	Total cost.	Order.	Basins.	Total cost.
.....	1	$222.99	548	1	$128.71
.....	3	402.98	554	1	154.35
.....	1	95.69	556	1	215.39
.....	1	206.28	557	1	114.00
.....	1	334.66	558	1	139.38
.....	2	330.04	559	1	152.91
.....	1	159.46	560	1	127.56
.....	1	168.16	561	1	133.38
.....	1	237.85	562	1	235.28
.....	4	679.90	563	1	156.76
.....	2	267.35	564	1	94.04
.....	1	112.23			
.....	1	240.57		31	5,110.92

TABLE No. 6.—*Sewer construction from the appropriation for main and pipe sewers, fiscal year 1920.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.
	Feet.	*Inches.*			*Feet.*	*Inches.*	
500	355.00	12	$1,526.90	533	330.00	12	$1,245.54
502	(1)			534	169.00	12	726.92
504	76.15	12	569.73	535	57.00	8	505.51
505	68.50	12	326.87	536	56.00	8	180.53
506	76.00	12	436.59	537	47.00	8	986.01
513	(2)		191.65		96.50	10	
514	(1)				108.00	12	
515	(1)			539	91.20	8	630.02
516	(1)			541	28.80	10	326.35
517	(3)		130.32		26.00	12	
518	54.50	10	297.28		9.00	15	
519	107.50	15	665.86	542	56.00	8	509.98
520	214.10	12	1,313.52	543	46.00	24	464.27
522	9.00	15	107.24		15.80	21	
	6.00	12		544	(3)		[4] 92.11
	3.00	21		549	174.50	24	803.16
523	15.00	24	412.80	550	228.00	10	778.16
524	3.00	24	16.25		20.00	15	
	6.00	12		551	(6)		118.39
526	(3)		51.86	552	(7)		150.15
529	(4)		[5] 483.45	553	(4)		276.63
530	174.40	15	1,066.55	555	(6)		104.90
	85.70	12		565	(3)		85.86
531	63.00	10	414.92				
532	57.00	12	228.91		2,932.65		16,225.13

[1] Canceled.
[2] One manhole.
[3] Bulkhead.
[4] House connections.
[5] Repaving not reported.
[6] Two manholes.
[7] Three manholes.

TABLE No. 7.—*Sewer construction from the appropriation for suburban sewers, fiscal year 1920.*

Order No.	Length, etc.	Size.	Total cost.	Order No.	Length, etc.	Size.	Total cost.
		Inches.				*Inches.*	
800	Junction chamber		$252.72	829	54.70 feet	24	$498.05
801	1 basin		163.23	830	1 basin		280.44
802	do		186.01	831	2 basins		403.68
803	54 feet	18	414.28	832	1 basin		157.28
804	15 feet	12	68.83	833	4 basins		555.24
805	1 basin		236.61	834	332.10 feet	12	1,134.86
806	do		202.68	835	304.10 feet	12	1,299.98
807	2 basins		[1] 379.58	836	2 basins		287.92
	51 feet	12		837	1 basin		80.04
	8.50 feet	21		838	2 basins		294.47
808	2 basins		232.67	839	59.60 feet	12	1,621.82
809	do		318.13		440.40 feet	10	
810	4 basins		529.56	840	64 feet	10	247.62
811	15 feet	24	93.33	841	1 basin		175.77
812	1 basin		201.65	842	do		110.16
813	1 manhole		128.39	843	2 basins		410.57
814	do		100.59	844	39 feet	24	432.87
815	98.50 feet	24	845.90		18 feet	21	
816	100 feet	24	769.73	845	145.35 feet	12	424.73
817	5 feet	10	119.38	846	2 basins		335.93
818	70 feet invert		587.21	847	192 feet	12	713.96
819	1 basin		151.27		18 feet	8	
820	2 basins		259.45	848	205 feet	10	436.44
821			(2)	849	415 feet	10	1,188.30
822	2 basins		266.18	850	150.50 feet	12	427.62
823	do		226.82	851	50 feet	12	525.19
824	71 feet	24	833.57	852	410.20 feet	10	1,116.09
825	2 basins		238.01	853	2 basins		263.18
826	(2)			854	1 manhole		1,464.69
827	2 basins		403.37	855	2 basins		282.66
828	do		323.62	856	8 feet	(3)	219.24

[1] Repaving not reported. [2] Canceled. [3] Connecting apron, 3 by 4 feet and wing walls.

ABLE No. 7.—*Sewer construction from the appropriation for suburban sewers, fiscal year 1920*—Continued.

Order No.	Length, etc.	Size.	Total cost.	Order No.	Length, etc.	Size.	Total cost.
		Inches.				*Inches.*	
857	50 feet	(2)	$1,071.68	883	3 basins		$361.86
858	Trunk sewer inspection		117.50	884	2 basins		[1] 261.27
859	Replacing manhole frames		23.45	885	1 basin		158.50
860	2 basins		307.61	886	....do		217.93
861	20.80 feet	10	167.42	887	2 basins		544.85
862	365 feet	12	1,047.38	888	....do		254.91
863	65.20 feet	12	313.76	889	1 basin		147.36
864	Driving piles		2,217.36	890	....do		99.39
865	70.50 feet	(4)	1,196.90	891	....do		106.16
866	323.70 feet	10	781.25	892	217 feet	(5)	3,268.89
867	1 basin		139.30	893	2 basins		250.01
868	3 basins		412.98	894	1 basin		129.12
869	2 basins		417.62	895	....do		[1] 182.79
870	30 feet	12	[1] 274.73	896			(2)
871	1 basin		[1] 400.90	897			(2)
872	2 basins		374.55	898			(2)
873	3 basins		327.81	899	1 basin		[1] 133.79
874	2 basins		154.21	900	2 basins		240.68
875	3 basins		323.44	901	....do		[1] 228.33
876	219.88 feet	18	955.57	902	....do		285.50
877	3 basins		348.59	903	1 basin		134.05
878	....do		327.30	904	....do		[1] 107.69
879	2 basins		227.71	905	....do		[1] 199.36
880	....do		272.74	906	....do		118.67
881	1 basin		121.82	907	18 feet	(6)	213.63
882	3 basins		387.14	908	360 feet	12	977.89
					4,988.23 feet		45,165.91

[1] Repaving not reported.
[2] Canceled.
[3] Connecting apron, 3 by 4 feet and wing walls.
[4] 4 feet 5 inches by 5 feet.
[5] 4 feet 6 inches by 4 feet 6 inches.
[6] Concrete lintel.

TABLE No. 8.—*Sewer construction under the whole-cost system from miscellaneous trust fund deposits for fiscal year 1920.*

Order No.	Location.	Length.	Size.	Remarks.	Amount of deposit.	Cost of work.	Amount returned.	For whom done.
		Feet.	*Inches.*					
1000	Alley of square No. 3038	25.00	12		$150.00	$91.83	$58.17	Israel Diamond.
1001	Monument grounds east of Sixteenth Street, south of B Street			Rope barricade	150.00	81.20	68.80	E. C. Graham.
1002	Sixteenth Street SE. between Good Hope Road and T Street	24.00	10		110.00	99.21	10.79	Anacostia Improvement Co.
1003	Garfield Street between Cleveland and Massachusetts Avenues.	294.30	12	Reconstructed 23 catch basins.	2,084.50	2,022.37	62.13	D. J. Howell & Son.
1004	Shepherd Street between Arkansas Avenue and Fourteenth Street NW.	20.00	24	1 manhole	1,600.00	1,299.44	300.56	B. H. Gruver.
1005	Webster Street NW. between Seventh and Eighth Streets	69.06	16	do	340.00	217.65	122.35	H. J. Bieber.
1006	Twelfth Street NE. between Hamlin and Irving Streets	191.00	8		475.00	475.00		W. J. Cook.
1007	Webster Street NW. between Seventh Street and Illinois Avenue.			50 cubic yards excess excavation.	75.00	66.53	8.47	D. J. Dunigan.
1008	Sherrier Place between Manning and Macomb Streets NW	306.55	10	1 manhole	900.00		[1] 900.00	Potomac Heights Land Co.
1009	Fourteenth and Newton Streets NW	105.00	10	do	450.00		[1] 450.00	A. D. Brown.
1010	Carlton Avenue NE. between South Dakota Avenue and Central Avenue.	85.00	10	do	135.00		[1] 135.00	Helen E. Jamison.
1011	Hamlin Street NE. between Twenty-seventh Street and South Dakota Avenue.	5.00	10		20.00	15.71	4.29	Henry A. Veith.
1012	Connecticut Avenue NW. south of Porter Street NW			Inspected storm-water outlet.	100.00	14.80	85.20	Geo. J. Easterday.
1013	North side of R Street NW. between Seventh and Eighth Streets.	62.50	8	1 manhole	375.00	298.10	76.90	Dr. J. French Simpson.
1014	Rhode Island Avenue NE. east of Twenth-eighth Street	81.54	10	30 cubic yards excess excavation.	375.00	373.04	1.96	Mrs. Sarah E. Pfau.
1015	Ninth Street NW., just north of K Street	21.75	10	1 manhole	440.00	271.76	168.24	Isadore Freund.
1016	Alley, square 144	10.00	12		90.00	79.59	10.41	George J. Cross.
1017	Connecticut Avenue and Military Road NW	246.40	6		350.00	184.29	165.71	R. Owen Edmonston.
1018	Taylor Street NW. between Thirteenth and Fourteenth Streets			Excess excavation	300.00	300.00		Clarence H. Small.
1019	North of Butternut between Eighth and Ninth Streets NW	364.80	8	2 manholes	725.00	723.86	1.14	G. S. Seek.
1020	[2]							
1021	Thirty-fourth Street NW. between Porter and Quebec Streets.	33.00	6	Collecting basin	150.00	133.78	16.22	Boss & Phelps.
1022	K Street NW between Jefferson and Thirty-first streets			1 gutter drop and manhole.	350.00	134.50	215.50	Georgetown Dock & Elevator Railway Co.
					9,744.50	6,882.66	2,861.84	

[1] Constructed under the assessment system.

[2] Canceled.

TABLE No. 9.—*Sewer construction from miscellaneous appropriations, fiscal year 1920.*

Order No.	Location.	Work done.	Total cost.	Appropriation.
1100	Fifth Street NW. between Quincy and Randolph Streets.	4 basins rebuilt.....	$474.03	Construction suburban roads and suburban streets, District of Columbia, 1918.
1101	Northeast and northwest corners Seventh and Quincy Streets NW.	2 basins rebuilt.....	142.02	Do.
1102	Northwest corner Seventh and Quincy Streets NW.	1 basin rebuilt.....	116.69	Do.
1103	North and south sides Pennsylvania Avenue NW. between Madison and Jackson Places.	Rope barricade.....	62.10	Emergency fund, District of Columbia, 1920.
1104	Pennsylvania Avenue NW. between Peace Monument and Seventeenth Street (both sides).	.....do.....	525.84	Maintenance, quartermaster, Marine Corps.
1105	Southwest and southeast corners Twelfth and G Streets NW.	2 basins rebuilt.....	319.68	Improvements and repairs, District of Columbia, 1918, repairs to streets.
1106	N Street SE. between South Capitol and Second Streets.	1 basin constructed, 4 basins rebuilt.	266.98	Improvements and repairs, District of Columbia, 1919, Southeast schedule.
1107	Northwest corner Vermont Avenue and H Street NW.	1 basin rebuilt.....	161.43	Improvements and repairs, District of Columbia, 1920, sidewalks and curbs.
1108	Northwest corner Ohio Avenue and Fourteenth Street NW.	.....do.....	20.54	Improvements and repairs, District of Columbia, 1920, Ohio Avenue, Twelfth to Fifteenth Streets.
1109	Northwest corner Ohio Avenue and Thirteenth Street NW.	.....do.....	18.55	Do.
1110	Northeast corner Ohio Avenue and Thirteenth Street NW.	.....do.....	165.58	Do.
1111	Southwest corner Ohio Avenue, and Twelfth Street NW.	.....do.....	184.66	Do.
1112	Vicinity of Aqueduct Bridge....	Drilling test holes...	74.32	Sewage disposal system, District of Columbia, 1920, upper Potomac interceptor.
1113	Fourteenth and U Streets and Fourteenth and V Streets NW.	2 basins.....	261.69	Improvements and repairs, District of Columbia, 1920, repairs to streets.
1114	Northeast corner Fourteenth and W Streets NW.	1 basin.....	130.50	Do.
1115	Fenton Street NE. between North Capitol and First Streets.	.....do.....	132.47	Improvements and repairs, District of Columbia, 1919, Northeast schedule.
1116	Twentieth and Kalorama Road NW.	.....do.....	104.90	Improvements and repairs, District of Columbia, 1920, repairs to streets.
1117	Northwest corner Spring Road and Cedar Street NW.	1 basin rebuilt.....	225.37	Improvements and repairs, District of Columbia, 1920, Spring Road NW., between Thirteenth and Fourteenth, pave.
1118	Southeast corner Spring Road and Holmead Place NW.	.....do.....	162.06	Do.
1119	Northwest corner Florida Avenue and R Street NW.	.....do.....	130.42	Improvements and repairs, District of Columbia, 1920, repairs to streets.
1120	East side Sixth Street NE. between Eye and K Streets.	.....do.....	107.16	Improvements and repairs, District of Columbia, 1920, Assessment and permit work.
1121	Under Aqueduct Bridge.....	190 feet ¾-inch water service.	232.98	Sewage disposal system, District of Columbia, 1920, upper Potomac interceptor.
1122	First Street West between Pennsylvania Avenue and Maryland Avenue.	2 basins.....	275.57	Improvements and repairs, District of Columbia, 1920, repairs to streets.
1123	Northeast and northwest corners Thirtieth and K Streets NW.	.....do.....	318.96	Improvements and repairs, District of Columbia, 1920, K Street, etc.
1124	Northeast and northwest corners Jefferson and K Streets.	.....do.....	203.53	Do.
1125	Northeast, northwest, southwest, and southeast corners Thirty-first and K Streets NW.	4 basins.....	437.86	Do.
1126	Northeast and northwest corners Wisconsin Avenue and K Street NW.	2 basins.....	423.73	Do.

TABLE No. 9.—*Sewer construction from miscellaneous appropriations, fiscal year 1920*—Continued.

Order No.	Location.	Work done.	Total cost.	Appropriation.
1127	K Street NW. between Potomac and Thirty-sixth Streets.	Pointing iron pipe crossing upper Potomac interceptor.	$48.18	Sewage disposal system, District of Columbia, 1920, upper Potomac interceptor.
1128	Northwest corner of Fifteenth and G Streets SE.	1 basin rebuilt	[1] 164.07	Improvements and repairs, District of Columbia, 1920, Assessment and permit work.
1129	Northwest corner Twenty-seventh and K Streets NW.	Junction chamber	1,008.10	Sewage disposal system, District of Columbia, 1920, upper Potomac interceptor.
1130	West side Georgia Avenue north of Gallatin Street.	1 basin	[1] 213.75	Street improvements, District of Columbia, 1920, Georgia Avenue to Military Road.
1131	(2)			
1132	Southwest corner Columbia Road and Park Place NW.	1 basin rebuilt	221.43	Street improvements, District of Columbia, 1920, Park Place NW., Hobart Place to Lamont Street.
1133	Nineteenth and K Streets, and Eighteenth and K Streets NW.	5 basins rebuilt	579.67	Improvements and repairs, District of Columbia, 1920, repairs to streets and alleys.
1134	West side of Eleventh Street NE. just south of G Street.	1 basin	101.49	Street improvements, District of Columbia, 1920, Eleventh Street NE. between H Street and Maryland Avenue, pave.
1135	(2)			
1136	Southwest corner of Lanier Place and Quarry Road.	1 basin rebuilt	[1] 134.53	Improvements and repairs, District of Columbia, 1920, Assessment and permit work.
1137	Euclid Street and University Place NW. (northeast and southeast corners).	2 basins rebuilt	291.87	Improvements and repairs, District of Columbia, 1920, repairs to streets and alleys.
1138	Southeast corner Twelfth and Newton Streets NE.	1 basin rebuilt	[1] 95.36	Improvements and repairs, District of Columbia, 1920, Twelfth Street NE., Monroe to Otis Streets.
1139	Twenty-seventh and K Streets NW.	3 by 5 feet suction conduit.	953.89	
1140	Northwest corner Georgia Avenue and Madison Street NW.	1 basin	136.58	Street improvements, District of Columbia, 1920, Georgia Avenue to Military Road.
1141	James Creek Canal between O and P Streets SW.	72 feet of 8-inch diameter drain.	156.70	Improvements and repairs, District of Columbia, 1920, repairs to streets.
1142	(2)			
1143	Twenty-seventh and K Streets NW.	Discharge chamber and gate wells.	2,022.61	Sewage disposal system, District of Columbia, 1920, upper Potomac interceptor.
1144	Do	4 by 6 feet cleaning tunnel.	1,297.73	Do.
1145	Do	Grading	74.43	Do.
1146	Do	Suction conduit, and bypass connection	939.60	Do.
1147	Do	40 feet 2-inch water service.	50.64	Do.
			14,170.25	

[1] Repaving not reported. [2] Cancelled.

TABLE No. 10.—*Inspectors and other employees of the sewer division temporarily employed and the appropriations from which paid, fiscal year 1920.*

Appropriations.	Inspectors.	Overseers.	Other employees.	Total.
Construction, sewerage system:				
Main and pipe sewers	$2,230.50	$1,733.65	$8,791.62	$12,755.77
Suburban sewers	2,648.00	2,559.00	8,971.35	14,178.35
Assessment and permit work	378.50	1,093.81	3,476.75	4,949.06
Construction, sewage-disposal system:				
Sewage pumping service	22.50	387.00	652.00	1,061.50
Upper Potomac interceptor	608.50		273.00	881.50
Anacostia main interceptor	468.00			468.00
Maintenance: Cleaning and repairing	159.55	1,980.03	2,922.74	5,062.52
Total	6,515.55	7,753.49	25,087.46	39,356.50

TABLE No. 11.—*Average cost of constructing pipe sewers and storm-water receiving basins for fiscal year 1920.*

Size of sewer.	Unit cost per foot.		Total cost per foot.
	Labor.	Material.	
8-inch diameter	$1.22	$0.72	$1.94
10-inch diameter	1.54	.82	2.36
12-inch diameter	1.97	.93	2.90
15-inch diameter	2.24	1.14	3.38
18-inch diameter	2.51	1.59	4.10
21-inch diameter	3.12	3.10	6.22
24-inch diameter	3.24	3.73	6.97
Storm-water receiving basins	59.36	50.11	109.47

TABLE No. 12.—*Average cost of constructing pipe sewers for 15 years.*

Year.	8-inch diameter.		10-inch diameter.		12-inch diameter.		15-inch diameter.		18-inch diameter.		21-inch diameter.		24-inch diameter.	
	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.
1906	$0.87	$0.33	$1.19	$0.47	$1.26	$0.54	$1.41	$0.67	$1.53	$0.78	$1.88	$0.93	$2.45	$1.24
1907	1.42	.43	1.43	.48	1.30	.56	1.46	.70	1.82	.85	2.09	.98	2.78	1.26
1908	1.34	.42	1.26	.50	1.44	.61	1.69	.75	1.91	.90	1.74	1.14	3.65	1.50
1909	1.34	.36	1.16	.36	1.46	.46	1.59	.56	1.58	.62	1.67	1.07	1.91	1.18
1910	1.00	.29	.99	.35	1.12	.43	1.19	.52	1.49	.66	1.52	.85	1.72	1.14
1911	1.01	.27	1.02	.32	1.17	.40	1.36	.52	1.64	.67	1.50	.75	1.82	1.08
1912	1.06	.25	1.08	.33	1.20	.39	1.46	.56	1.63	.67	1.70	.88	1.76	.98
1913	1.02	.26	1.07	.29	1.35	.38	1.53	.58	1.74	.75	1.93	1.08	2.20	1.28
1914	.78	.28	1.08	.45	1.32	.51	1.44	.69	1.56	.89	1.69	1.34	2.11	1.41
1915	.58	.19	1.12	.42	1.25	.51	1.56	.67	1.63	.89	1.89	1.18	1.78	1.45
1916	.76	.25	1.00	.36	1.05	.43	1.31	.62	1.49	.72	1.87	1.13	2.11	1.16
1917	.79	.40	.85	.44	.96	.56	1.11	.68	1.19	.95	1.25	1.31	1.31	1.37
1918	.77	.42	.98	.66	1.47	.92	1.56	1.14	1.71	1.78	2.02	2.49	2.16	2.79
1919	.80	.60	1.68	.84	1.91	1.01	1.92	1.29	2.38	1.54	2.59	2.71	3.62	3.36
1920	1.22	.72	1.54	.82	1.97	.93	2.24	1.14	2.51	1.59	3.12	3.10	3.24	3.73

TABLE No. 13.—*Contract prices for materials for 15 years.*

Year.	Cement per barrel.	Sand per cubic yard.	Gravel per cubic yard.	Terra-cotta pipe, linear foot.						
				8-inch.	10-inch.	12-inch.	15-inch.	18-inch.	21-inch.	24-inch.
1906	$1.35	$0.85	$1.05	$0.125	$0.1647	$0.2236	$0.2997	$0.3672	$0.5454	$0.7263
1907	1.55	.74	.97	.155	.195	.261	.353	.443	.5454	.848
1908	1.52	.84	1.04	.155	.225	.30	.405	.51	.75	.975
1909	1.20	.55	.75	.155	.1707	.239	.3233	.4066	.5975	.7775
1910	.975	.54	.65	.125	.15	.20	.27	.3825	.5625	.73125
1911	.99	.395	.485	.115	.175	.22	.30	.42	.55	.715
1912	.98	.345	.435	.121	.176	.22	.31	.40	.59	.715
1913	.94	.345	.435	.105	.15	.18	.351	.494	.78	.815
1914	1.11	.54	.69	.11	.256	.25	.432	.608	.96	1.04
1915	1.04	.54	.69	.11	.23	.245	.43	.60	.96	1.04
1916	1.00	.54	.69	.11	.16	.21	.284	.40	.63	.6825
1917	1.33	.59	.74	.15	.23	.28	.39	.551	.90	.975
1918	1.95	.69	.99	.18	.42	.54	.72	1.00	2.00	2.25
1919	2.30	.95	1.35	.28	.4725	.6075	.8316	1.3785	2.23866	2.5498
1920	2.18	.80	1.20	.28	.4725	.50	.8316	.985	1.48	2.5498

TABLE No. 14.—*Maintenance work, sewerage system, for 10 years.*

	1920	1919	1918	1917	1916
Main sewers cleaned.....feet..	8,315	4,043	595	5,467	3,741
Pipe sewers cleaned.....do....	143,061	175,917	169,582	189,796	156,773
Pipe sewers flushed.....do....	4,746,199	5,166,538	5,222,929	5,983,299	6,949,719
Manholes flushed.....	11,796	13,032	13,083	15,597	17,611
Sumps, regulators, gates flushed and inspected.....	4,370	4,284	3,733	3,662	2,102
Basins flushed.....	17,442	21,322	17,984	17,938	15,768
Basins cleaned.....	27,441	32,986	30,481	39,256	45,514
Sludge removed:					
Pipe sewers.....cubic feet..	9,497	4,702	5,450	5,837	5,220
Basins.....do....	206,181	184,587	217,662	191,288	198,128
Sediment chamber.....do....	51,759	51,435	55,323	75,195	71,500
Screens.....pounds..	1,066,871	940,348	948,118	884,755	804,866
Main sewers inspected.....miles..	147.79	147.79	144.97	142.93	139.53
Pipe sewers inspected.....do....	898.90	978.50	989.00	1,133.00	1,316.00
Basins repaired.....	246	146	148	178	148

	1915	1914	1913	1912	1911
Main sewers cleaned.....feet..	4,885	1,113	4,525	4,071	300
Pipe sewers cleaned.....do....	156,773	145,767	123,545	123,545	161,190
Pipe sewers flushed.....do....	6,077,129	6,339,122	6,705,367	5,906,405	5,685,423
Manholes flushed.....	15,473	17,208	18,594	16,733	15,294
Sumps, regulators, gates flushed and inspected.....	3,618	4,222	3,949	2,245	530
Basins flushed.....	15,242	18,586	18,416	5,293	11,950
Basins cleaned.....	51,201	45,502	40,244	38,760	60,379
Sludge removed:					
Pipe sewers.....cubic feet..	4,499	4,079	3,723	2,479	3,538
Basins.....do....	191,928	160,660	168,696	147,741	166,428
Sediment chamber.....do....	71,100	62,856	66,744	53,140	58,131
Screens.....pounds..	708,388	798,666	869,640	1,084,128	833,617
Main sewers inspected.....miles..	137.36	134.00	130.00	126.24	122.78
Pipe sewers inspected.....do....	1,150.00	1,200.00	1,270.00	491.47	469.42
Basins repaired.....	163	124	117	141	155

TABLE No. 15.—*Summary of sewerage system for 25 years.*

Fiscal year.	Total length.			Total cost.		Actual cost maintenance and operation.	
	Trunk sewers.	Pipe sewers.	All sewers.	Sewerage system.[1]	Sewage-disposal system.	Sewerage system.	Sewage-disposal system.[2]
1896.....	77.65	270.28	347.93	$8,476,431.62	.....	$45,000.00	.....
1897.....	81.36	284.06	365.42	8,661,731.62	.....	45,000.00	.....
1898.....	83.92	298.91	382.93	8,901,731.62	.....	50,000.00	.....
1899.....	85.65	307.36	393.01	9,047,731.62	.....	50,000.00	.....
1900.....	88.30	317.20	405.50	9,309,731.62	.....	50,000.00	.....
1901.....	90.89	327.86	418.75	9,515,731.62	.....	50,000.00	.....
1902.....	93.49	338.13	431.62	9,696,731.62	.....	58,000.00	.....
1903.....	96.31	351.73	448.04	9,817,731.62	.....	58,000.00	.....
1904.....	99.12	357.70	456.82	9,940,731.62	.....	58,000.00	.....
1905.....	103.21	365.60	468.81	10,040,881.62	.....	58,000.00	.....
1906.....	109.09	375.26	484.35	10,128,881.62	.....	42,000.00	.....
1907.....	112.20	389.24	501.44	10,363,831.62	$3,714,823.00	38,000.00	[3] $37,295.00
1908.....	113.94	407.24	521.18	10,536,681.62	3,952,768.65	44,500.00	[3] 38,625.00
1909.....	117.24	424.02	541.26	10,688,681.62	4,031,888.27	45,000.00	58,000.00
1910.....	119.20	448.78	567.98	10,860,556.62	4,095,630.70	48,500.00	58,000.00
1911.....	122.78	469.42	592.20	11,204,188.79	4,146,228.01	50,000.00	58,000.00
1912.....	126.01	492.52	618.53	11,539,374.28	4,228,555.94	56,000.00	59,500.00
1913.....	130.90	513.38	644.28	11,922,177.04	4,366,524.43	50,000.00	59,500.00
1914.....	133.50	527.99	661.49	12,470,940.74	4,495,830.13	50,500.00	62,000.00
1915.....	137.36	544.75	682.11	13,032,082.86	4,624,186.31	50,500.00	64,000.00
1916.....	139.53	562.53	702.06	13,294,695.25	4,671,279.19	50,000.00	64,500.00
1917.....	142.93	574.44	717.37	13,569,830.21	4,685,165.71	50,000.00	64,500.00
1918.....	144.97	585.87	730.84	13,949,036.45	4,720,324.92	50,000.00	64,500.00
1919.....	147.79	591.03	738.82	14,231,065.00	4,803,662.25	50,000.00	64,500.00
1920.....	149.93	597.86	747.79	14,543,218.90	4,864,207.93	58,000.00	75,000.00

[1] Exclusive of sewage-disposal system.
[2] The sewage-disposal system went into operation July 1, 1906.
[3] Handling a part of the sewage only during these years.

TABLE No. 16.—*Rights of way acquired for sewer extension, fiscal year 1920.*

For separate-system sewer along line of the Metropolitan Branch of the Baltimore & Ohio Railroad, through lot 20, square 3184.[1]

For separate-system sewer in line of Reno Road between Albemarle Street and Nourse Road through parcel 35/78.[1]

For separate-system sewer in line of Forty-fifth Street, between Yuma and Windom Place, through parcel 23/9.[2]

For combined-system trunk sewer (Luzon Avenue Trunk), line Luzon Avenue south from Aspen Street, through parcel 84/14.[2]

For separate-system sewer, east from Ninth Street through parcel 103/121.[2]

For separate-system sewer, east from Ninth Street, through parcel 103/108.[2]

For separate-system sewer between Eighth and Ninth Streets, through parcel 103/136.[2]

For combined-system trunk sewer (Connecticut Avenue Heights trunk sewer) in line of East and West Alley Sq. 1857 between Connecticut Avenue and Thirty-ninth Street, through parcel 37/53.[1]

For combined-system trunk sewer (Connecticut Avenue Heights trunk sewer) in line of East and West Alley Sq. 1857 between Connecticut Avenue and Thirty-ninth Street, through parcel 37/28.[1]

For combined-system trunk sewer (Connecticut Avenue Heights trunk sewer) in line of East and West Alley Sq. 1857 between Connecticut Avenue and Thirty-ninth Street, through parcel 37/54.[2]

For combined-system trunk sewer (Connecticut Avenue Heights trunk sewer) in line of East and West Alley Sq. 1857 between Connecticut Avenue and Thirty-ninth Street, through parcel 37/70.[2]

For combined-system trunk sewer (Connecticut Avenue Heights trunk sewer) in line of East and West Alley Sq. 1857 between Connecticut Avenue and Thirty-ninth Street, through parcel 37/71.[1]

For separate-system sewer in line of Gates Road between Thirtieth Street and Military Road through parcel 45/77.[2]

TABLE No. 17.—*Electric conduits laid July 1, 1919, to June 30, 1920.*

Number of ducts.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	8,538	8,538	1,361	1,361	.....	.....	9,899	9,899
2	2,961	5,922	13,919	27,838	.....	.....	16,880	33,760
3	.....	.....	305	915	.....	.....	305	915
4	15,294	61,176	7,208	28,832	5,772	23,088	28,274	113,096
6	.....	.....	1,383	8,298	2,645	15,870	4,028	24,168
8	14,241	113,928	3,117	24,936	1,874	14,992	19,232	153,856
12	937	11,244	.....	.....	539	6,468	1,476	17,712
16	179	2,864	.....	.....	.....	.....	179	2,864
24	180	4,320	.....	.....	.....	.....	180	4,320
28	58	1,624	.....	.....	.....	.....	58	1,624
Total	42,388	209,616	27,293	92,180	10,830	60,418	80,511	362,214

[1] Consideration paid. [2] Voluntary dedication.

TABLE No. 18—*Summary of electric conduits laid from March 27, 1900, to June 30, 1920.*

Number of ducts.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Railway & Electric Co.		Western Union Telegraph Co.		Postal Telegraph & Cable Co.		Totals.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	96,767	96,767	58,793	58,793					515	515	13,831	13,831	169,906	169,906
2	163,780	327,560	355,506	711,012	15,809	31,618	13	26	4,262	8,524	1,126	2,252	540,496	1,080,992
3	265	795	6,402	19,206					6,975	20,925			13,642	40,926
4	564,774	259,096	208,771	835,084	29,424	117,696	33,414	133,656	9,729	38,916	35,428	141,712	881,540	3,526,160
5									4,177	20,885			4,177	20,885
6	46,127	276,762	117,078	702,468	10,818	64,908	5,117	30,702	4,232	25,392	17,313	103,878	200,685	1,204,110
7			82	574	29	203							111	777
8	115,304	922,432	70,883	567,064	17,178	139,424	19,086	152,688			1,140	9,120	223,591	1,788,728
9	7,325	65,925	114	1,026									7,439	66,951
10	850	8,500	30,260	302,600	32	320	8,275	82,750	183	1,830			39,600	396,000
11									258	2,838			258	2,838
12	53,872	646,464	14,278	171,336	1,447	17,364	11,458	137,496			283	3,396	81,338	976,056
13	374	4,862	212	2,756					309	4,017			895	11,635
14	1,224	17,136	3,831	53,634	4,306	60,284	1,880	26,320					11,241	157,374
15	68	1,020			28	420			44	660			140	2,100
16	6,359	101,744	9,276	148,416	1,042	16,672							16,677	266,832
17			636	10,812									636	10,812
18			5,643	101,574			2,214	39,852					7,857	141,426
20	1,079	21,580	4,471	89,420	1,362	27,240			160	3,200			7,072	141,440
22			823	18,106	9,109	200,398	134	2,948					10,066	221,452
24	3,356	80,544	3,069	73,656	26	624							6,451	154,824
25			304	7,600									304	7,600
26			126	3,276	280	7,280							406	10,556
28	2,285	63,980					87	2,436					2,372	66,416
30	53	1,590	313	9,390									366	10,980
32	77	2,464	515	16,480	1,002	32,064							1,594	51,008
36	3,854	138,774	26	936	125	4,500							4,005	144,180
38							193	7,334					193	7,334
40			1,589	63,560									1,589	63,560
44	446	19,624											446	19,624
56			749	41,944									749	41,944
58	7	406											7	406
64	106	6,784	176	11,264									282	18,048
70			53	3,710									53	3,710
72			118	8,496									118	8,496
82			35	2,870									35	2,870
Total	1,068,352	5,064,799	894,132	4,037,063	92,017	719,015	81,871	616,208	30,844	127,702	69,121	274,189	2,236,337	10,838,956

This table does not include 14,508 feet of United States Government conduit and 768 feet of private conduit.

TABLE No. 19.—*Electric conduits, lengths laid each year to June 30, 1920.*

Fiscal year.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Railway & Electric Co.		Western Union Telegraph Co.		Postal Telegraph & Cable Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Laid prior to Mar. 27, 1900	343,885	1,813,866	79,920	698,920	48,218	399,851	75,743	569,332			14,663	18,944	562,439	3,500,913
1901	16,387	65,952	876	4,690			88	704					17,351	71,346
1902	8,098	89,958											8,098	89,958
1903	24,655	105,592	123,604	640,448									148,259	746,040
1904	15,635	65,412	35,905	138,649									51,540	204,061
1905	13,798	56,892	39,409	147,002			4,670	37,360					57,877	241,254
1906	50,057	287,311	80,433	278,683					10,635	44,995			141,125	610,989
1907	38,053	252,741	75,110	281,405	5,285	29,652			383	1,710			118,831	565,508
1908	39,705	154,940	58,005	228,725	23	92			11,463	51,775			109,196	435,532
1909	58,607	235,224	45,919	172,768	11,769	90,660	859	6,644	2,322	7,515			119,476	512,811
1910	46,096	159,422	56,582	140,859	263	1,788	420	1,804	329	652			103,690	304,525
1911	56,029	240,518	44,822	297,752	913	6,318					531	531	102,295	545,119
1912	63,841	336,353	19,966	45,697	9,417	58,548	42	168			50,238	232,992	143,504	673,758
1913	39,883	146,117	22,980	64,630	2,300	18,400					2,915	15,704	68,078	244,851
1914	45,018	170,578	24,391	51,778			34	136	607	1,214			70,050	223,706
1915	35,488	130,400	19,059	48,938					763	1,474	410	2,460	55,720	183,272
1916	40,894	164,136	16,847	35,513	1,230	37,254	15	60	980	3,153	364	3,558	60,330	243,674
1917	31,547	115,964	32,645	118,132	142	2,384			355	526			64,689	237,006
1918	50,374	161,434	54,854	326,322	1,534	12,892							86,762	500,648
1919	27,914	102,263	35,512	223,972	93	758			3,007	14,688			66,526	341,681
1920	42,388	209,616	27,293	92,180	10,830	60,418							80,511	362,214
Totals	1,068,352	5,064,689	894,132	4,037,063	92,017	719,015	81,871	616,208	20,844	127,702	69,121	274,189	2,236,337	10,838,866

TABLE No. 20.—*Gas mains, laid by sizes, July 1, 1919, to June 30, 1920.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	*Linear feet.*	*Linear feet.*
2-inch			
4-inch	8,254	2,684	10,938
6-inch	16,316	808	17,124
8-inch			
12-inch	2,213		2,213
16-inch			
24-inch	62		62
Total	26,845	3,492	30,337

TABLE No. 21.—*Gas mains, laid by sizes, July 1, 1907, to June 30, 1920.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	*Linear feet.*	*Linear feet.*
1½-inch	9,298	3,120	12,418
2-inch	6,873	1,895	8,768
2½-inch		620	620
3-inch	5,983		5,983
4-inch	234,058	48,231	282,289
6-inch	281,573	63,158	344,731
8-inch	17,224	32,688	49,912
10-inch	5,493	4,107	9,600
12-inch	80,857	38,638	119,495
16-inch	7,330	234	7,564
20-inch	10,747		10,747
24-inch	9,840		9,840
30-inch	459		459
Total	669,735	192,691	862,426

TABLE No. 22.—*Gas mains, lengths laid by years, July 1, 1907, to June 30, 1920.*

Fiscal year.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	*Linear feet.*	*Linear feet.*
1907	36,605	8,450	45,055
1908	61,642	19,777	81,419
1909	83,692	25,498	109,190
1910	69,237	2,202	71,439
1911	48,192	10,983	59,175
1912	88,583	50,178	138,761
1913	61,234	11,688	72,922
1914	48,475	5,839	54,313
1915	45,274	14,415	59,690
1916	29,577	24,940	54,517
1917	19,779	5,864	25,643
1918	31,822	4,170	35,992
1919	18,778	5,195	23,973
1920	26,845	3,492	30,337
Total	669,735	192,691	862,426

REPORT OF THE MUNICIPAL ARCHITECT.

WASHINGTON, *September 17, 1920.*

SIR: I have the honor to forward herewith the eleventh annual report of the office of the municipal architect for the fiscal year ending June 30, 1920.

During the year two building projects were under construction, as follows:

Building.	Appropriation available.	Cost.	Completed or to be completed.
Portable school buildings (20)	Aug. 31, 1918 July 11, 1919	$78,460.00	Feb. 20, 1920
Furnaces (22)		1,782.00	
Blackboards		945.00	
Head house used by the Norfolk & Washington Steamboat Co., Water Street, at foot of Seventh Street SW., repair of damage caused by fire on Mar. 22, 1920		19,905.35	June 9, 1920

Specifications and proposals prepared.

Building.	Work.	Date of advertisement.
Fish wharf and market	Structural steel for oyster shuckers' shed	July 10, 1919
E. V. Brown School	Heating system, old building	July 12, 1919
Fish wharf and market	Wharf flushing system	July 24, 1919
Bradley School	Installation of electric service mains and service.	July 29, 1919
Towers School	Installation of electric mains and service	Do.
Public crematorium	Repair of furnace	July 30, 1919
Truck House No. 6	Installation steam heating system	Aug. 1, 1919
Portable school buildings	Furnishing and erection of 20	Aug. 4, 1919
District Columbia Reformatory	Furnishing trim, etc., for physician's residence.	Aug. 14, 1919
Fire-boat wharf	Furnishing and driving three piles	Aug. 18, 1919
Brightwood School	Retubing and repairing boiler	Aug. 20, 1919
Bradley School	Fans, motors, starters, etc	Do.
Blake School	do	Do.
Magruder School	do	Do.
Towers School	do	Do.
Central High School (old)	Repairing boilers	Sept. 2, 1919
Head house for Norfolk & Washington Steamboat Co.	Furnishing steel smoke stack	Sept. 3, 1919
Portable school buildings	Furnishing 22 ventilating furnaces	Sept. 5, 1919
Head house for Norfolk & Washington Steamboat Co.	Taking down old smokestack and replacing with new one.	Sept. 12, 1919
District of Columbia Workhouse and Reformatory.	Breeching for boilers	Oct. 6, 1919
Engine House No. 22	Making electric service connection	Oct. 8, 1919
Police court	Retubing boiler	Oct. 22, 1919
Smallpox hospital	do	Oct. 27, 1919
Fish wharf and market	Lettering for building	Nov. 11, 1919
New Central High School	Machine shop equipment, electrical	Nov. 19, 1919
Do	Machine shop equipment, lathes, grainding machine, inclinable press, arbor press.	Do.
Do	Machine shop equipment, tool and cutter grinding machine.	Do.
Do	Machine shop equipment, grinding and milling machines.	Do.
Fish wharf and market	Lettering for building	Do.
Washington Asylum and jail	Repairing roof of insane ward	Nov. 24, 1919
Armstrong Manual Training School	Removal of building at No. 125 O Street	Nov. 28, 1919
Police station No. 8	Installation steam boiler	Dec. 8, 1919
Portable schools	Installation blackboards	Dec. 10, 1919
Fish wharf and market	Installation scale track	Jan. 27, 1920
Brightwood School	Electric service connection	Jan. 30, 1920
Park View School	Overhauling temperature regulating system.	Jan. 31, 1920
Workhouse and Reformatory, District of Columbia.	Piping for central power plant	Feb. 10, 1920
Wilson Normal School	Overhauling temperature-regulating system.	Feb. 24, 1920
Park View School	Installation of 2 lanterns	Do.
Dunbar High School	Overhauling temperature-regulating system.	Do.
Armstrong Manual Training School	do	Do.
Head house for Norfolk & Washington Steamboat Co.	Repair of damage by fire of Mar. 22, 1920	Mar. 30, 1920
Industrial Home School (white)	New steam boiler and equipment	Mar. 31, 1920
Petworth School	Construction of addition	Apr. 1, 1920
Various school buildings	Repairs to furnaces	Apr. 17, 1920
Engine house No. 22, and truck house No. 11.	Installation steam heating	Apr. 29, 1920

Specifications and proposals prepared—Continued.

Building.	Work.	Date of advertisement.
District of Columbia Workhouse and Reformatory.	Piping for central power plant	May 12, 1920
Do	Electric generating set	June 7, 1920
Petworth School	Construction of addition	June 10, 1920
House of Detention	Installation of window guards and stairway inclosure.	Do.
Police station No. 7	Installation of boilers, etc	June 12, 1920
Reservoir School	Installation of two hot-air furnaces	Do.
Smallpox hospital	Changes and additions to toilets	June 15, 1920
Engine house No. 8	Installation steam heating system	June 16, 1920
Mitchell playground	Construction retaining wall	Do.
McKinley Manual Training School	Overhauling thermostats, etc	June 18, 1920
Petworth School	Construction of addition	June 21, 1920
Police station No. 4	Furnishing steam boiler	June 26, 1920
Police station No. 3	do	Do.
Deanwood School	Construction of addition	June 30, 1920

As these reports are intended to summarize the recommendations of the heads of departments for "changes in the service deemed advisable," I can refer to my last report, which covers the more important changes, which long experience convinces me would be beneficial to the service. I will not repeat in full the recommendations in this report; but, briefly stated, the recommendations are:

1. That appropriations for repairs and improvements of District buildings should be expended under the direction and supervision of the municipal architect and the superintendent of repairs, as provided by law, and not by the heads of other departments, whose training and experience does not fit them to properly direct such expenditures.

2. That instead of allotments from miscellaneous appropriations made by the heads of departments for repairs and improvements of buildings a specific appropriation should be made for such purposes and expended according to law.

3. For central heating plants where two or more school buildings or other District buildings are on the same square or reservation.

4. For the use of portable school buildings for tubercular pupils instead of wasting fuel by open windows in mechanically ventilated buildings.

5. To improve methods for removal of ashes and rubbish from the District buildings.

6. For the selection, by examination by the board of examiners, of engineers, firemen, and janitors in school buildings who are capable of assisting in the upkeep of the buildings and the heating plants, as required by law.

7. That the limitation on expenditures for personal services should bear some ratio to the amount of work and not be a fixed or arbitrary sum.

8. For a Government commission to settle the controversy over "open window" and mechanical ventilation.

9. For increase in salaries of the technical force, and higher pay for the employees of the repair shop, who are now getting less than the subordinate mechanics under their direction.

10. Special appropriation for sanitary drinking fountains of approved type.

11. That lump-sum or one-fund appropriations be made for new school buildings to accommodate a stated number of pupils, the same as is now done for repairs and improvements, and that the commissioners and the board of education determine on the size and character of buildings necessary to accommodate the pupils and provide for the most economical use of the fund which may not be sufficient in all cases to complete a building of a given size as now fixed by the several distinct appropriations. Such expenditure of the fund for the partial completion of new buildings was suggested by several members of the Senate Committee on Appropriations last session.

12. Requests have been made for the extension of the Business High School and the McKinley Manual Training School (sometimes referred to as the "Technical High School"). The Business High School can not be extended, as it now occupies the whole block, and three additions have been added to the McKinley School, each time necessitating expensive changes in the main structure to accommodate the extension. Therefore, I would recommend that instead of incongruous and unnecessarily expensive additions to these buildings that the present buildings be converted to business and vocational schools for girls, and that new buildings be provided, with suitable equipment and with sufficient athletic grounds, for boys.

I submit herewith the report of the superintendent of repairs showing the amount expended in labor and material on the several District buildings.

For the past five years the repair lists have been made up from lists submitted by the heads of departments and not by the superintendent of repairs, who has added only such items as, in his judgment, were absolutely necessary for safety or the preservation of the property.

I would call attention to the fact that the colored schools have been receiving their full share of all funds expended for construction and repair. The figures show that 32.8 per cent of the funds for repairs were spent on colored schools, although the colored pupils are less than one-third of the school population. That $13.94 was spent on each white pupil, while $14.31 was spent on each colored pupil from the funds appropriated for repairs and improvements, and it has been carefully estimated that the colored people pay only about 5 per cent of the taxes for support of the schools.

The report of the superintendent of repairs shows the inspection of steam boilers made by the inspector of steam boilers, and in addition to these inspections, a committee from the building inspector's office, the fire department, and the superintendent of repairs makes an annual inspection to see that precautions are taken to guard against fire.

The report of the constructing engineer at the workhouse and reformatory will give a record of the work accomplished during the past year. The costs, however, should be considered more in the nature of closely approximated estimates, as the engineer does not control the purchase and distribution of building materials and the preparation of pay rolls and vouchers, and expenditures have been made and charged to "Permanent construction" which may not appear in his estimates of cost. The construction work at the workhouse was under this office from 1908 to 1912, and from 1916 to the

present time, but the expenditures have been accounted for by the superintendent of the workhouse and reformatory.

SNOWDEN ASHFORD,
Municipal Architect.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF REPAIRS.

Public schools, District of Columbia, 1920, repairs to buildings.

Appropriation		$200,000.
Deficiency		10,000.
Credit by transfers (this includes 10 per cent for supervision)		28,588.
Stock on hand June 30, 1919		47,340.
		285,928.
Expended as follows:		
Carpentering—		
Labor	$21,539.48	
Material	8,972.83	
Tinning—		
Labor	15,828.90	
Material	9,150.90	
Heating—		
Labor	13,240.33	
Material	25,454.76	
Plumbing—		
Labor	6,697.85	
Material	3,497.03	
Painting—		
Labor	16,918.69	
Material	7,958.84	
Glazing—		
Labor	2,771.63	
Material	2,537.51	
Steam fitting—		
Labor	10,857.01	
Material	9,174.80	
Grading—		
Labor	10,237.71	
Material	1,708.47	
Gas-engine and electrical work—		
Labor	7,424.70	
Material	8,943.90	
Miscellaneous—		
Labor	18,789.40	
Material	6,811.04	
Gas, pro rata share	138.01	
Electricity, pro rata share	190.26	
Ice, pro rata share	48.99	
Forage, pro rata share	5,077.54	
Coal, pro rata share	646.52	
Car tickets, pro rata share	420.00	
Engineer stables, pro rata share	542.10	
Telephones, pro rata share	10.50	
Miscellaneous charges	55.40	
Stock on hand June 30, 1920	70,177.29	
Balance	105.98	
		285,928.

The expenditures from the appropriation for the fiscal year 1920 for—

White schools	150,120.
Colored schools	65,524.
	215,645.

Metropolitan police, District of Columbia, 1920, repairs to stations.

Appropriation		$8,000.00
Expended as follows:		
Carpentering—		
Labor	$714.78	
Material	237.30	
Tinning—		
Labor	174.14	
Material	201.10	
Heating—		
Labor	123.10	
Material	408.28	
Plumbing—		
Labor	569.16	
Material	123.46	
Glazing—		
Labor	27.86	
Material	8.00	
Steam fitting—		
Labor	218.92	
Material	[1] 3,198.65	
Painting—		
Labor	785.93	
Material	501.07	
Gas-engine and electrical work—		
Labor	62.10	
Material	31.99	
Miscellaneous—		
Labor	22.78	
Material	2.07	
Gas, pro rata share	4.00	
Electricity, pro rata share	5.00	
Ice, pro rata share	2.00	
Forage, pro rata share	200.00	
Coal, pro rata share	15.00	
Miscellaneous charges	1.60	
Stock on hand June 30, 1920	159.00	
Balance	202.71	
		8,000.00

Fire department, District of Columbia, 1920, repairs to engine houses.

Appropriation		$16,000.00
Expended as follows:		
Carpentering—		
Labor	$3,412.12	
Material	2,195.96	
Tinning—		
Labor	1,063.80	
Material	460.02	
Heating—		
Labor	99.80	
Material	184.48	
Plumbing—		
Labor	1,580.86	
Material	1,297.95	
Painting—		
Labor	383.07	
Material	141.85	
Glazing—		
Labor	65.49	
Material	75.04	

[1] In this item is included steam equipment purchased in June which will be installed during the fiscal year 1921.

Expended as follows—Continued.		
Steam fitting—		
Labor	$698.82	
Material	617.28	
Grading—		
Labor	515.99	
Material	180.79	
Gas-engine and electrical work—		
Labor	849.54	
Material	1,186.38	
Miscellaneous—		
Labor	.44	
Material	5.58	
Gas, pro rata share	8.00	
Electricity, pro rata share	10.00	
Ice, pro rata share	4.00	
Forage, pro rata share	400.00	
Coal, pro rata share	30.00	
Telephones, pro rata share	5.25	
Stock on hand June 30, 1920	159.00	
Balance	368.49	
		$16,000.00

Courts, District of Columbia, 1920, repairs to buildings.

Appropriation		$1,500
Expended as follows:		
Carpentering:		
Labor	$97.80	
Material	35.48	
Tinning—		
Labor	61.38	
Material	12.76	
Painting—		
Labor	380.37	
Material	202.58	
Plumbing—		
Labor	104.55	
Material	22.80	
Glazing—		
Labor	3.46	
Material	2.19	
Steam fitting—		
Labor	42.64	
Material	[1] 431.01	
Gas engine and electrical work—		
Labor	50.20	
Material	22.01	
Balance	30.77	
		1,500

Work in addition to that on "Public schools, District of Columbia, 1920—Repairs to buildings"—"Fire department, District of Columbia, 1920—Repairs to engine houses"—"Metropolitan police, District of Columbia, 1920—Repairs to stations"—"Courts, District of Columbia, 1920—Police court—Repairs to buildings."

Police court	$106.83
Juvenile court	38.24
Schools (other than repairs to buildings)	6,214.55
Fire department (contingent expenses)	302.19
Police department (other than repairs to stations)	1,081.81
Health department	1,500.34

[1] This item includes the retubing of the boiler by J. H. Thomas.

c crematorium	$14.90
r department	139.25
culosis Hospital	1,320.79
trial Home School	2,199.22
trial Home School for Colored Children	154.88
ipal Lodging House	47.77
convenience stations	375.18
Library	1,515.93
ts (maintenance)	1,367.96
market (maintenance)	1,148.15
l and stable	953.59
er	374.02
l of charities	135.12
gency fund	539.92
ical department	50.71
ng commission	150.00
ts	975.07
llaneous trust fund	39.20
on various construction jobs under continuous appropriations	42,344.29
	63,089.91

E.—The above represents work which was done by this shop during the year 1920 upon written requests from the officials in charge of the various priations.

ORT OF INSPECTION OF STEAM BOILERS, PUBLIC SCHOOLS, 1920.

School.	Number of boilers.	High pressure.	Low pressure.	Tested.	Safety blows.	Date of inspection.	Remarks.
rong Manraining.	4	4	.....	200	110	July 23, 1919	Repaired fire box sides, furnished new gaskets, cleaned smoke pipe.
.....	2	2	.....	75	25	June 27, 1919	Repaired fire box sides, furnished new gaskets, replaced new parts on automatic return valves. Cleaned smoke pipe.
owen	1	1	.....	90	40	July 7, 1919	Furnished new gaskets. Cleaned smoke pipe.
wood	1	.....	1	75	25	July 11, 1919	Cleaned smoke pipe. Boiler retubed by contract.
land	2	1	.....	100	30	July 12, 1919	Repaired fire box sides, furnished 25 fire brick in arch, smoke pipe cleaned, furnished 2 tubes, 200 paving brick for floor in space back of bridge wall, furnished new stem in handhole in back head. Furnished new gaskets.
.....	.....	.....	1	60	25	.....	
ess High	3	3	.....	180	80	July 17, 1919	Repaired fire box sides, cleaned smoke pipe, furnished new gaskets, repaired brick work in arches 2 and 3, repaired grates and made general minor repairs.
entral High	4	.....	3	75	20	Aug. 2, 1919	Repaired fire box sides, installed new gaskets, 128 3-inch tubes installed by contract, cleaned smoke pipe.
o	.....	1	.....	80	50	.....	
Central High	4	4	.....	200	120	Aug. 26, 1919	Repaired fire box sides, cleaned smoke pipe, furnished new gaskets, furnished three 2-inch valve disks—in soot blower, repacked flanges in steam line.
ess Heights	2	2	.....	90	25	June 28, 1919	Repaired fire box sides, cleaned smoke pipe, furnished new gaskets, furnished 150 fire brick for bridge wall.
h	2	.....	1	75	25	June 26, 1919	Cleaned smoke pipe, furnished new gaskets.
o	.....	.....	1	.....	.....	.....	
.....	2	.....	2	75	25	June 9, 1919	Repaired brick work of fire box cleaned smoke pipes, furnished new gaskets.

Report of inspection of steam boilers, public schools, 1920—Continued.

School.	Number of boilers.	High pressure.	Low pressure.	Tested.	Safety blows.	Date of inspection.	Remarks.
Dennison	2	.....	2	75	25	June 4, 1919	Repaired brick work of fire box, cleaned smoke pipe, furnished new gaskets, furnished tube in No. 2.
Dunbar High	3	3	.....	* 190	110	July 23, 1919	Cleaned smoke pipe, furnished 12 6-inch gaskets in main steam line, run new drain from trap from header.
Eastern High	2	.....	2	90	30	June 24, 1919	Cleaned smoke pipe, furnished new gaskets, repaired fire box sides, furnished 100 fire brick on bridge wall, relayed 100 loose brick on ventilating flue on roof.
Emery	2	.....	2	75	20	June 18, 1919	Repaired fire box sides, cleaned smoke pipe, furnished new gaskets, painted smoke stack on roof, new bridge wall and brick work around smoke stack, furnished 20 fire brick and 80 pounds clay.
Force	2	.....	2	75	25	July 8, 1919	Cleaned smoke pipe, furnished new gaskets, repaired fire box sides, pointed up around hand-holes, repaired arches, and furnished 80 fire brick.
Franklin	2	.....	2	75	30	.....do.....	Repaired fire box sides, cleaned smoke pipe, furnished new gaskets, furnished 120 fire brick in back connections and front of boiler, repair main stop valve seat, on No. 1 boiler, new stem in 3-inch blow-off valve on No. 2 boiler.
Gales	2	.....	2	75	25	June 19, 1919	Cleaned smoke pipe, furnished new gaskets, replaced defective tube in No. 1 .
Garnet	2	.....	2	75	20	June 17, 1919	Cleaned smoke pipe, furnished new gaskets, replaced two damaged grates and two grate pins.
Grant	2	2	.....	90	25	June 16, 1919	Furnished new gaskets, repaired brickwork of fire box, furnished 20 fire brick, 80 pounds clay, furnished new hood on smoke-stack and cleaned smoke pipe.
Henry	2	.....	2	75	20	June 12, 1919	Cleaned smoke pipe, furnished new gaskets, replaced 3-inch blow-off pipe, new hood and smokestack, patched two lower sections of stack, placed clean-out hole at bottom of stack.
Jefferson	2	2	.....	60	30	July 1, 1919	Cleaned smoke pipe, furnished new gaskets, repaired fire-box sides, pointed up around hand-holes, lining for fire doors on south boilers, two bolts for hand-holes.
Lincoln	2	.....	2	75	25	June 26, 1919	Furnished new gaskets, cleaned smoke pipe, new section in bottom of smokestack.
M Street power plant.	2	2	.....	190	110	July 15, 1919	Cleaned smoke pipes, furnished new gaskets, repaired fire-box sides, repaired arches in both boilers, furnished 25 fire brick.
McKinley Manual Training.	6 (1)	6	....	190 100	80 50	.....do.....	Cleaned smoke pipe, furnished new gaskets in steam line to safety valve, repaired fire-box sides, repaired 2-inch blow-off.
Miner Normal	2	2	.....	160	80	Aug. 22, 1919	Cleaned smoke pipes, furnished new gaskets, repaired fire-box sides, repaired water feed—hand holes and trap in boiler room.
Peabody	2	.....	2	75	20	June 23, 1919	Cleaned smoke pipe, furnished new gaskets.
Powell	2	2	.....	75	40	July 15, 1919	Furnished new gaskets, cleaned smoke pipe, repaired ash-pit door, brickwork pointed up and repaired, and pumps packed.

Report of inspection of steam boilers, public schools, 1920—Continued.

School.	Number of boilers.	High pressure.	Low pressure.	Tested.	Safety blows.	Date of inspection.	Remarks.
Wheaton	2	.....	2	75	25	June 19, 1919	Cleaned smoke pipe, furnished new gaskets, repaired fire box sides, new lining on fire doors, repaired doors in rear of boiler, repaired brickwork, 100 pounds of clay.
Stevens	2	.....	1	75	20	June 6, 1919	Cleaned smoke pipe, furnished new gaskets, repaired brickwork of fire box, installed new set of grates No. 112, renewed smokeless fire box 40½ inches long.
Do	.....	.....	1	60	25	.....	
Sumner	2	.....	2	80	25	June 6, 1919	Cleaned smoke pipe, installed new gaskets, repaired brickwork of fire box, handhole in rear of boiler supplies, with new stem welded on.
Syphax	1	1	.....	100	40	June 30, 1919	Cleaned smoke pipe, installed new gaskets, repaired fire-box sides, furnished 14 soft-coal grates, 4 feet by 3½ inches, and 100 fire brick.
Tenley	1	.....	1	75	25	July 10, 1919	Cleaned smoke pipe, installed new gaskets, repaired fire-box sides, and brickwork around front of boiler.
Wallach	2	.....	2	75	20	June 25, 1919	Cleaned smoke pipe, installed new gaskets.
Webster	2	.....	2	75	20	June 14, 1919	Cleaned smoke pipe, installed new gaskets.
Western High	4	.....	4	100	15	July 10, 1919	Cleaned smoke pipe, installed new gaskets, repaired fire-box sides, 1-3-4 repaired in arches, No. 2 in back connection. Furnished 150 fire brick. No. 1 furnished 8 bolts in door lining. Run blow off pipe on top of concrete floor.
Wilson Normal	2	2	.....	180	80	July 15, 1919	Cleaned smoke pipe, installed new gaskets, repaired fire box sides, furnished four 6-inch gaskets in main steam line and 1¼-inch union on soot blower.

REPORT OF CONSTRUCTING ENGINEER, DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY.

LORTON, VA., *August 16, 1920.*

SIR: Following is the constructing engineer's report for the year ending June 30, 1920, for the workhouse and reformatory of the District of Columbia:

This year there was a most decided decrease in the number of prisoners at the workhouse, and especially a decrease in the number of mechanics among the prisoners, with a direct result in both the progress of the construction work and the cost of both construction and repair work.

A brief summation of each job follows:

Work of the District of Columbia Reformatory.

PERMANENT CONSTRUCTION.

Title.	Number days prison labor.	Number brick.	Cubic yards sand and gravel.	Paid labor.	Bought material.	Cost previously reported.	Total chargeable to the appropriation.
Physician's residence	2,125	82,000	27	$3,137.36	$5,911.28	$1,118.24	$10,166.98
Industrial railroad	[1] 2,750		3	914.50	504.73	5,658.26	7,077.49
Permanent buildings	4,100	100,000	35	345.56	628.02	None.	973.58
Sewage plant	360	2,400		419.76	164.60	769.18	1,353.54
Assistant superintendent's residence (Totten House)	41			43.30	150.38	885.02	1,078.70
Pollock House	2		4	2.30	36.62	3,165.34	3,204.26
Residence No. 1	5			21.50	124.46	2,718.87	2,864.83
Chief clerk's residence (house on 10A lot)	522	2,500		496.20	483.70	42.45	1,022.35
Bakery	140			84.00	151.58		
Locomotive house		[2] 2,500					
Railroad culvert, in hog lot		[2] 17,000			98.43		98.48
Water main					197.07		
Saw mill	3			75.00	213.17		
Constructing engineer's office					194.83		
Constructing Engineer Ford	14			35.00	210.24	737.21	947.45
Wagon road to permanent site	90						
Wages constructing engineer's office				4,763.04			
Total				10,337.52	9,069.16		
Total chargeable to permanent construction							19,406.68

CONSTRUCTION AND REPAIR FOR ADMINISTRATION AND UPKEEP.

Superintendent's residence [2]					$435.33		
Ice house at District of Columbia workhouse [2]					94.69		
Work by plumbing shop					250.45		
Paint shop					138.59		
Blacksmith shop					149.31		
Carpenter shop					24.08		
General repair	1,695			87.86	109.82		
Main building and dining room (temporary buildings)	94			40.00	335.06		
Rest hall, hospital, and officers' quarters	78			25.80	6.21		
Boiler house	37			55.20	164.19		
Punishment house	3						
Pumping station					12.00		
Flag pole					4.00		
Rustic bridge	33				4.69		
Corncrib					9.88		
Hogpens	23						
Stable and shed	219			38.70	117.51		
Culvert on telegraph road		5,000	10		23.00		
Veterinary's office					2.14		
Superintendent's park	1			12.98			
Stone crusher				27.60			
Ninth Street wharf					8.00		
Brickyard					7.68		
Administration building, District of Columbia workhouse					4.18		
Laundry					4.25		
Electrical shop					138.66		
Total cost this year				288.14	2,043.72		
Grand total				$2,331.86			

CENTRAL POWER PLANT.

Railroad derrick	295			$443.77	$567.34		
Power house	239			772.86	958.16		
Total chargeable this year							$2,742.13
Previously reported							37,253.29
Total cost to date							39,995.42

[1] See workhouse report, $170.40.

[2] See workhouse report.

Work of the District of Columbia Reformatory—Continued.

WORK OF THE DISTRICT OF COLUMBIA WORKHOUSE.

Title.	Number days prison labor.	Number brick.	Cubic yards sand and gravel.	Paid labor.	Bought material.	Cost previously reported.	Total chargeable to the appropriation.
house	1,044	75,400	54	$1,716.50	$678.67	.....	$2,395.17
oilers, etc., at boiler house	23	.....	.....	24.40	224.70	.....	249.10
etal stacks at boiler house	45	.....	.....	104.22	155.64	.....	259.86
t boiler house	170	.....	.....	424.66	193.40	.....	618.06
s office	178	15,000	15	375.33	129.79	.....	505.12
use	79	.....	3	134.00	87.51	.....	221.51
.....	55	.....	12	93.80	24.79	.....	118.59
chen	262	.....	.....	150.20	108.73	.....	258.93
.....	85	.....	.....	130.25	238.68	.....	368.93
.....	106	.....	.....	46.40	129.73	.....	176.13
elegraph road	80	40,500	25	41.40	240.70	$323.73	605.83
ower site	31	.....	.....	10.50	29.58	.....	40.08
.....	23	.....	5	16.10	19.86	.....	35.96
.....	64	.....	.....	10.50	77.21	.....	87.71
residence	78	.....	.....	134.00	152.98	.....	286.98
g engineer's Ford	.....	.....	.....	.....	[2] 20.29	.....	20.29
s at shipyard	623	.....	.....	822.15	1,062.44	.....	1,884.59
.....	18	.....	.....	12.00	185.34	.....	197.34
.....	24	.....	5	41.85	369.41	.....	411.26
.....	361	6,250	5	308.80	355.08	.....	663.88
cottage	18	30,000	20	5.00	63.75	.....	68.75
uarters	326	3,800	7	244.22	507.48	.....	751.70
air	1,889	.....	.....	421.88	619.06	.....	1,040.94
itchen	55	.....	.....	11.50	25.37	.....	36.87
.....	393	1,400	35	281.70	531.54	.....	813.24
residence	241	.....	16	210.73	[2] 55.11	.....	265.83
.....	57	.....	.....	204.00	13.28	.....	217.28
and bathhouse	42	.....	.....	58.40	138.12	.....	196.52
op	64	6,700	13	83.38	298.14	.....	381.52
se	26	.....	.....	15.20	[2] 3.47	.....	18.67
ccoquan Creek	6	.....	.....	5.33	2.33	.....	7.56
ttage	111	.....	.....	70.80	126.88	.....	197.68
.....	.....	.....	.....	4.50	166.45	.....	170.95
.....	163	1,200	11	158.10	134.52	.....	292.62
shop	.....	.....	.....	420.00	305.62	.....	725.62
hop	.....	.....	.....	533.00	191.83	.....	.....
hop	.....	.....	.....	550.00	146.77	.....	.....
hop	11	.....	.....	.....	112.25	.....	.....
.....	.....	.....	.....	625.00	226.00	.....	.....
.....	.....	.....	.....	60.00	726.37	.....	.....
ion building	127	.....	2	49.50	197.62	.....	.....
ent's residence	447	1,000	9	167.80	340.24	.....	.....
ent's park	.....	.....	.....	.....	25.02	.....	.....
ation	.....	.....	.....	.....	111.24	.....	.....
artment	230	.....	.....	226.96	443.60	.....	.....
t wharf, Washington, D.C.	3	.....	.....	.....	78.68	.....	.....
perintendent's residence	244	.....	5	388.25	502.30	.....	.....
.....	6	.....	.....	36.18	260.46	.....	.....
house	[2] 35	.....	.....	44.65	[2] 1.88	.....	46.53
verts	249	1,000	10	126.50	116.13	.....	242.63
.....	4,165	.....	.....	512.50	[2] 170.40	.....	682.90
s	326	.....	.....	.....	.....	.....	.....
r	12	.....	.....	21.20	.....	.....	21.20
.....	27	.....	.....	45.60	.....	1,657.99	1,703.59
Giles Run for railroad	12	.....	.....	20.66	.....	.....	20.66
.....	.....	.....	.....	22,041.88	23,818.73	.....	.....
chargeable to the appropriations this year	.....	.....	.....	.....	.....	.....	45,860.60

[2] See workhouse report.

iations from which above was expended are as follows:

s for repairs to building	$5,000.00
, repairs and construction	80,000.00
rom appropriation for maintenance	1,418.88
.....	86,418.88

C. B. BACKUS,
Constructing Engineer.

IUNICIPAL ARCHITECT.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, *July 31, 1920.*

SIR: I submit herewith annual report covering the transactions the building division during the fiscal year ended June 30, 1920.

No report of Federal Government operations has been recei during the year.

Statement of permits issued from July 1, 1919, to June 30, 1920.

	Number.	Value.
Brick:		
Repairs	1,568	$2,224,096
Dwellings	617	4,456,770
Apartments	24	4,526,000
Stores	101	1,198,470
Warehouses	10	189,000
Garages	756	1,668,970
Churches	2	13,000
Gas filling stations	3	5,700
Lodge	1	84,000
Club house	1	150,000
Substation	1	59,000
School	1	100,000
Offices	6	46,700
Post office	1	3,500
Blacksmith shop	1	1,600
Hotel	1	900,000
Laundry	3	125,000
Workshop	4	6,600
Storage houses	6	171,630
Store and warehouse	1	35,000
Dormitory and chapel	1	250,000
Bank	2	37,744
Bakery	1	30,000
Sales room and repair shop	1	85,000
Sales room and office building	1	50,000
Sheds	8	2,755
Factories	2	60,000
Stables	3	32,500
Pump house	1	900
Stores and dwellings	4	41,000
Chapel	1	4,000
Studio	1	3,000
Stores and apartments	5	77,500
Hollow tile:		
Dwellings	29	223,895
Garages	181	100,774
Apartment	1	200,000
Store and dwelling	1	5,000
Sheds	3	500
Repairs	6	90,150
Shop	1	200
Office	1	1,000
Lunch room	1	30,000
Cafeteria	2	9,000
Stable	1	250
Warehouse	1	5,000
Stores	4	16,600
Stone:		
Store	1	
Garage	1	
Concrete:		
Dwellings	2	
Apartment	1	2
Warehouse	1	7
Store	1	
Stable	1	
Repairs	11	6
Booth and waiting station	1	
Garages	48	1
Dormitory	1	4
Storage house	1	
Office building	1	3
Smokehouse	1	
Auto salesroom and garage	1	1
Auto showroom	1	1
Metal:		
Garages	1,118	2
Sheds	56	1
Repairs	4	
Frame:		
Sheds	340	1
Repairs	517	1
Dwellings	476	2,8
Garages	189	1
Factory	1	
Warehouse	1	
Playhouse	1	
Stable	1	
Church	1	
Barber shop	1	
Boathouse	1	
Stores	2	
Hall	1	
Machinery:		
Elevators	69	2
Motors	589	3
Boilers	39	7
Total	6,852	22,6
Awnings	110	
Signs	1,234	1
Grand total	8,196	22,6

Summary showing the distribution of improvements in the respective sections of the District and the values of same.

	Buildings.	Repairs, etc.
Northeast	$277,815	$190,341
Southeast	227,110	140,307
Northwest	7,152,995	1,970,111
Southwest	46,397	152,941
County	11,422,589	1,058,256
Total	19,126,906	3,511,956
	3,511,956	.....
Sum total [1]	22,638,862	.....

[1] Does not include awnings or signs, the values of which are estimated.

Grand total for all building operations, $22,659,452.

Comparative statement for years 1919 and 1920.

	New buildings.	Repairs, etc.	Dwellings.	Apartments.	Business buildings.
1920	2,346	4,506	1,124	26	1,196
1919	1,598	3,434	749	21	828
	[1] 748	[1] 1,072	[1] 375	[1] 5	[1] 368

[1] Increase.

Valuation of building operations, including awnings and signs:

1920	$22,659,452
1919	10,520,866
Increase	12,138,586

Permits issued, number of, including awnings and signs:

1920	7,525
1919	4,948
Increase	2,577

Projections beyond the building line, number for which permits issued:

1920	1,345
1919	903
Increase	442

Estimated number of buildings in the District of Columbia.

	Brick.	Tile.	Concrete.	Stone.	Frame.
1920, erected	1,571	226	61	2	486
1920, razed	73	.....	.....	.....	111
	1,498	226	61	2	375
1919	66,629	.....	.....	.....	26,806
Total estimated number standing	68,127	226	61	2	27,181

Tile and concrete heretofore included under brick.

A comparison of the above tabulation with reports of previous years show that building operations during the fiscal year 1920 far exceed in volume and value the operations of any other year in the history of the department. This means a corresponding increase in the labors of the entire staff of employees, imposing upon the in-

spectors, with the grossly inadequate transportation afforded, such a volume of work that its full performance is a physical impossibility. And while labor and building material conditions are such as to indicate that the present year will be less active than 1920, yet the prospects point to business greatly in excess of the prewar average.

It is urged as an absolute necessity, therefore, that the division be allotted the use of two automobiles and be furnished street car transportation in an amount more nearly commensurate with insistent need.

It is pressingly important, too, that an appropriation of not less than $200 be made for the employment of temporary inspectors during the inauguration period.

Thousands of visitors will be in Washington, and there will be hundreds of observation or reviewing stands constructed. Each of these stands must be examined by this office as to structural safety and encroachment upon public space. The present quota of inspectors will be physically unable to cope with the situation unless their normal duties are sacrificed to such an extent as to menace the safety of the general public as the result of faulty or affirmatively dangerous building construction.

JOHN P. HEALY,
Inspector of Buildings.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF INSPECTOR OF STEAM BOILERS.

WASHINGTON, D. C., *September 20, 1920.*

SIR: I have the honor to submit the following report for the fiscal year ended June 30, 1920, together with fees received and expenses incurred:

Boilers inspected	490
Boilers inspected for the District of Columbia	73
Boilers inspected for the United States	9
Boilers condemned as unfit for further use	6
Cases of scale and deposit	85
Cases of defective setting	46
Cases of defective steam gauges	15
Cases of defective tubes	45
Cases of defective shell plates	11
Total amount received	$2,450.00
Total amount expended	$375.00
	$2,075.00

Very respectfully,

E. F. VERMILLION,
Inspector of Steam Boilers.

The INSPECTOR OF BUILDINGS.

REPORT OF THE BOARD OF EXAMINERS OF STEAM ENGINEERS.

WASHINGTON, *September 9, 1920.*

SIR: The board of examiners of steam engineers have the honor to submit to you the report for the year ending June 30, 1920. The following table shows the work as it progressed during each month:

	Meetings held.	Applicants received.	Applicants approved.	Applicants not competent.	First class.	Second class.	Third class.	Special class.
1919.								
July	4	14	9	5	2	1	2	4
August	5	8	2	6		1	1	
September	4	15	4	11	1		2	1
October	5	11	2	9			2	
November	5	22	11	11			10	1
December	4	15	9	6	1		5	3
1920.								
January	5	14	7	7			5	2
February	4	15	5	10		2	3	
March	4	12		12				
April	5	19	7	12			6	1
May	4	7	2	5				2
June	4	6	2	4			2	
	53	158	60	98	4	4	38	14

Respectfully submitted.

E. F. VERMILLION.
H. BOESCH.
WM. I. EVANS.

ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF INSPECTOR OF PLUMBING.

WASHINGTON, *September 10, 1920.*

SIR: I have the honor to make the thirty-eighth annual report of the plumbing inspection division, engineer department:

Preliminary examinations	7,202
Cast-iron sewers:	
New	3,273
Repairs	698
Terra-cotta sewers:	
New	31
Repairs	265
Main sewers tapped	1,143
Rough work in—	
New houses	1,643
Old houses	1,328
Water service	252
Notices served	156
Peppermint tests and final inspections	1,199
Work not ready for inspection when ordered	315
Changes ordered in work incorrectly installed	59
Special inspections of municipal work	10
Gas	688
Complaints	2,828
Total for field inspectors	21,000

Inspections of a general nature by the head of the office, 2,121; examination of materials, etc., by the principal assistant, visits to homes of witnesses, police court, and general police work which does not appear elsewhere, 860; and special inspections in connection with general construction work for the District, 434. These added to number of "field inspections" make a total of 24,505 recorded inspections.

The total number of inspections made by the field force divided by the actual number of days on duty shows that the average day's work was about 12½ inspections per man. The largest number of inspections in any one day was 34. While the total number of inspections this year was less than last, this was more than made up for by the fact that a very great deal of the regular inspection work was in the outlying districts, due to suburban development, which inspections consume much greater average time. This office also handled more complaint cases than usual, inspections on which take more time than on regular inspection of plumbing.

The office record shows that the plumbing work in new buildings during the fiscal year amounted to $1,642,456, and it is estimated that there was $864,200 worth of remodeling and repair, making a total amount of plumbing work in the District in private buildings of about two and one-half million dollars. There was in addition much plumbing work done in United States Government buildings, as well as in structures owned by the District, of which this office keeps no account.

POLICE COURT CASES.

The total number of warrants obtained was 34, divided as follows:

Violations of plumbing regulations	11
Work done by unlicensed plumbers	23
Total	34

These cases were disposed of as follows:

Nolle prossed on compliance with commissioners' order	12
Fined	20
Personal bonds	0
Dismissed	2
Total	34

Amount collected from fines, $295.

REGULATIONS.

During the fiscal year there were no changes made in the existing plumbing regulations.

COMPULSORY DRAINAGE.

During the last fiscal year 89 cases of sewer and water connections and other plumbing work were referred to this office by the health office and other divisions of the District government for execution under the terms of the drainage act and the nuisance act, the cost of which was to be assessed against the property. In a very great

many of these cases the required repairs were made by the agent or owner after proper representation of the facts, and there remained but 5 cases where this office finally had to do the work and assess the cost. At the close of the fiscal year there were still pending in this office 19 cases which could not be immediately prosecuted by reason of legal questions, question of ownership, etc., and there are 4 cases still under notice.

This office again recommends that this appropriation be increased, as this appropriation of but $1,000 is assessable against the property and returned to the Treasury in taxes, with the exception of some very small items.

PLUMBING BOARD.

There were 24 regular meetings held for the examination and rating of candidates for master plumbers and gas fitters during the last year. The total number examined was 42. The number of original candidates examined for licensing as master plumbers and gas fitters was 16, of whom 1 passed. Of the 19 who had been previously examined for licensing as master plumbers and gas fitters (7 of whom have taken the examination twice or more within the past fiscal year) 3 passed and 16 failed.

Examination of candidates appearing before the board one or more times resulted as follows:

Examination.	Passed.	Failed.	Examination.	Passed.	Failed.
First	1	15	Fourth	1	4
Second		7	Fifth		1
Third	2	3	Sixth		1

There were on June 30, 1920, 235 registered master plumbers, about 150 being actively engaged in business. There were also eight registered gas fitters in business.

PUBLIC CONVENIENCE STATIONS.

There were in operation throughout the year four convenience stations, three of them open from 6 a. m. until midnight, with two shifts of attendants, each working nine hours per day. The fourth station, that at Fifteenth and H Streets NE., was for the greater part of the year operated on a 12-hour basis. The largest station, that at Seventh Street and Pennsylvania Avenue NW., accommodated 7,576,137 persons; that at Thirteen-and-a-half Street and Pennsylvania Avenue NW., 1,105,092; that at Ninth and K Streets NW., 1,386,635; that at Fifteenth and H Streets NE., 486,910, making a total patronage of over 10,500,000, this being nearly 1,000,000 a month, nearly 30,000 per day, over 1,600 per hour, and nearly 27 for each minute the stations were open.

The women used the stations a little over one-eighth as much as the men and contributed about one-tenth of the cash receipts. These cash receipts for the year amounted to $7,003.17, and consisted of fees received for use of pay toilets, the rental of clean towels, commis-

sions on telephone service, etc., being about 40 per cent of the total cost of operation of the stations. Of the several cities exchanging records with this office, some have no receipts at all, by reason of the lack of any charges, and the rest average about 15 per cent of the cost of operation in receipts. I believe this showing is due to the general excellence of our stations, the service we give in our pay compartments, and the close track that is kept by means of our coin-lock system.

The need for new stations is being continually pointed out, and it is strongly recommended that an effort be made to enlarge the number in our business section as soon as may be possible.

SALARIES.

During the past year this office has lost several men by reason of the inadequate salaries, one position alone having been vacated three times, and it is most earnestly recommended that an unusual effort be made to obtain salaries for these technical men commensurate with their duties.

All of the men in this office have worked faithfully and well, and I can not, in acknowledging the value of their work, do other than recommend them to your most earnest consideration.

A. R. McGonegal,
Inspector of Plumbing.

The Inspector of Buildings.

REPORT OF THE PERMIT CLERK, ENGINEER DEPARTMENT.

Washington, *August 30, 1920.*

Sir: I have the honor to submit the following report of the permit clerk's office, giving the character and number of permits issued during the fiscal year ended June 30, 1920:

Permits for which fees were paid.

Water connections	$1,374.00
Repairs	739.00
Sewer connections	1,500.00
Repairs	714.00
Gas and electric light connections	3,754.00
Repairs	151.00
Auto pipe lines and private conduits	28.00
Conduits, electric, construct and repair	458.00
Fences, erect to inclose parkings	353.00
Gas mains, construct and repair	123.00
Guard stones, place in alleys	11.00
Manholes, electric, construct, enlarge, and connect with sewers	11.00
Poles, telegraph and telephone, erect, remove, and replace	668.00
Miscellaneous	3.00
Total	10,107.00

Permits for which fees are not paid.

Water, special	96
Sewer, special	741
Gas and electric	15
Blasting	13
Cables, string aerial	94
Copings, erect back of sidewalks	143

:s, construct across sidewalks and parkings	187
steam rollers, and steam shovels, move	243
ıclosing parkings, repair	34
y across:	
ings	248
space	8
, pave	120
s:	
temporarily	31
's and streets, grade and repair	62
space, grade	8
s:	
across	58
or repair	164
py temporarily	2
s and parkings, use for business purposes	17
ıd electric railways	2
ıstruct and repair in parkings	79
es, adjust and replace, gas	42
im and remove	37
tates Government	24
ect and repair retaining	99
bles, lay in parkings	35
g overhead house connections	843
g overhead telephone and telegraph	130
oles, renew and replace	10
ıeous	42
extended and renewed	105
ccupy temporarily	2
ɔtal	3,736

tables show an increase of 60.9 per cent in permits for which e paid and 81.6 per cent in permits for which fees are not er those issued during the fiscal year ending June 30, 1919.
thousand and three files were referred to this office, record ade, permits issued and reports made when necessary, the endorsed and returned to the respective divisions having ion over the inspection for which permits were issued.
cations for all permits were sorted and arranged according on of the work and filed for ready reference. Written re- ; made of all permits for excavations in the public space and ed to the engineer of highways.
ıendation is due the assistant permit clerk for the cheerful ion and help given by him at all times.
ery respectfully,

H. M. WOODWARD,
Permit Clerk.

: INSPECTOR OF BUILDINGS.

REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, *October 9, 1920.*

STREET LIGHTING.

;reet lighting system has again been little more than barely ıed, there having been no increase in appropriation since that l year 1918. In maintenance, difficulties have been encoun- the lighting companies, due to the common after-war con-

ditions affecting labor and the procurement of materials; these have peculiarly affected restoration following casualties, in all classes of service, and the lighting, extinguishing, and condition maintenance of the gas service.

Additions and extensions have necessarily been confined to some of the more pressing demands and needs, in newly occupied unlighted streets, in alleys of enlarged occupancy, and in connection with certain street improvements where a deferment of needed changes in lighting would have been an economical waste.

The net increase in the number of lamps of all kinds is 350, about 1¾ per cent. Of the 378 lamps added (gross), 287, or practically 76 per cent, were "designation lamps" or the lowest powered gas or electric. Improvement projects have "been again deferred by reason of war and after-war conditions."

In cities in general, the present day purposes of street illumination may be put as follows:

1. To aid in keeping the peace.
2. To enable pedestrians and vehicles to avoid obstructions of any sort.
3. To ornament or improve the appearance of thoroughfares generally.
4. To act as an advertising medium and increase trade.

In the first and foremost of these purposes the needs of the District of Columbia are not fully met. The police department, in an excellent spirit of cooperation, occasionally brings to attention of this department its views of a specific shortcoming in this respect; welfare organizations also; and residents with frequency. On the other hand, no well-informed and fair-minded person will indorse statements which have appeared in the public press to the effect that Washington is the worst-lighted city in the country. There are many streets, roads, and alleys needing lights; even some arteries of communication with outlying territories for considerable distances are without light; but for wide dissemination of a very moderate degree of illumination, I am confident Washington is not below the average. The average, in cities as usually governed, is undoubtedly below what it should be, being probably affected by the commercial interests of "down town."

As to the second of the purposes, three considerations are prominent: (*a*) The fact that, compared with a total of little more than 500 miles of paved roadway, there are nearly 300 miles of streets tree planted (mostly at curb), fine feature of the city as it is, introduces difficulties and problems of street illumination and renders impracticable some of the commonly accepted methods of securing maximum of illumination with minimum of cost; (*b*) a thorough sympathy with and a very willing deference to the letter and spirit of legislation discouraging unsightly overhead wire construction has prohibited the use of pendant lamps over the center of street intersections, a very efficient scheme in favorable locations. These two considerations unfavorably affect the purely economical aspect of accomplishment of lighting results in Washington with a given outlay and probably do not occur to thoughtless critics. Finally, (*c*) the change which has come in recent years in vehicular traffic with the vogue of motor vehicles, occasioning greater average congestion, greater average speed, and possibly a less average of directing intel-

ence, that of the horse being eliminated, has operated to magnify e importance of purpose (2) above and to occasion the need of a gher degree of street illumination in order to properly effect that rpose.

As to the third of the purposes, the esthetic, in the broad, serious, d important sense, no argument for governmental application of, even setting the pace for, the beautiful in the Nation's Capital, ithin discretion, should be necessary here. The current design of namental electric post, embodying a memory of the lamented illet and approved by the National Fine Arts Commission, is idently appreciated by the public, as there are frequent petitions r the extension of lighting by that system.

As to the fourth and last of the purposes of street illumination in ties generally, no money is expended on this score in Washington om appropriations. Whether some street lighting might be done r this purpose, regulated by the commissioners but at the voluntary imary cost of the class primarily benefited, is an open question of licy.

Washington has fortunately been saved from the adoption of any mboyant scheme of "white-way lighting," though nearly uniersal. Invidious critics, consciously or unconsciously, miss this. ven Pennsylvania Avenue, though effectively lighted for the first d second purposes and though attractively lighted, has a far from gh degree of illumination, and more lighting for the third purpose uld be amply justified by the importance of the thoroughfare. e lighting of the city rather generally is on somewhat too low a ane. In the central portion of most cities the use of incandescent mps of 400 candlepower and 600 candlepower is quite general. We ve 74 only of 200 candlepower and 250 candlepower, all the reinder being of 100 candlepower or less. For reasons explained ove, the use of high-power lamps to the extent common elsewhere not indicated in Washington, but there are many places where their e would be advantageous. There are many points, important street ersections, etc., particularly where circles, squares, etc., occasion a viation from direct route of travel, which need emphasis, a showg forth, a distinctiveness over and above the current expression.

Besides these needs, for some time past existent, there is the need e to the city's growth. Streets newly built up need light for the fety and convenience of their residents. Sections newly increased population add traffic importance to connecting and radiating oroughfares. The extension and growth of commercial occupancy eate added requirements, even considered solely from the point of ew of patrons, the public in general.

Practically none of these many needs can be met with the appropiation at the present level. Although mindful of the many needs other directions, I plead for generous consideration of these, to e end that in a few years Washington may be, as it surely deserves be, the best lighted city in the world, without extravagance.

ARC LIGHTING.

This system has been affected by the addition of record of two 6.6-mpere magnetite arc lamps and the discontinuance of thirteen 4-amere magnetite arc lamps. The addition of the two, however, was

simply a restoration of lamps discontinued in a previous year due to building operations. The 13 discontinued were replaced by incandescent electric lamps of 100 candlepower in connection with the improvement of Ohio Avenue, Twelfth to Fifteenth Streets, NW. The total number of arc lamps connected June 30, 1920, was 784, as compared with 795 at the close of the preceding year.

INCANDESCENT ELECTRIC LIGHTING.

The number of incandescent electric lamps added is 226; none discontinued. Of these, 137 were of 60 candlepower in alleys and suburban highways and 89 were of 100 candlepower on ornamental posts. Of these 89, 22 were on special ornamental posts, modeled after the standard design but modified to suit the case, on the new "Benning Viaduct," carrying Benning Road NE, over Kenilworth Avenue and the railroad rights of way; 52 in newly improved Ohio Avenue NW., Twelfth to Fifteenth Streets, both curbs and central parking, and immediately adjacent in intersecting streets; 8 in a new "isle of safety" at the intersection of Florida Avenue and Twenty-second Street, north of Massachusetts Avenue, and immediately adjacent in the intersecting highways; 6 west side Vermont Avenue NW., H to I Streets; 1 south side of K Street NW. between Sixth and Seventh Streets.

The total number of incandescent lamps connected June 30, 1920, was 8,125, compared with 7,899 at the close of the preceding year. Of these, 4,092 were 60 candlepower, compared with 3,955; 3,959 of 100 candlepower, compared with 3,870; and 74 of 200 candlepower and 250 candlepower, as in the preceding year.

MANTLE GAS LIGHTING.

The number of mantle gas lamps added was 133; discontinued, 8; a net increase of 125, widely distributed in single lamps and small groups. The 8 discontinued were replaced by 6 incandescent electric lamps. The total of mantle gas lamps connected June 30, 1920, was 10,556, compared with 10,431 at the close of the preceding year.

DESIGNATION LAMPS.

The number of designation lamps added was 17, 4 gas and 13 electric, and the number discontinued was 7 gas, a net increase of 10; the 7 gas discontinued were replaced by 7 of the electric. The total number of designation lamps connected June 30, 1920, was 535 (391 gas, 144 electric), compared with 525 (394 gas, 131 electric) at the close of the preceding year.

A campaign is in progress to replace, as rapidly as funds permit, street designation signs of colorless characters on colored glass (some red, some blue) by signs in black characters on white glass. This materially increases the legibility, a decidedly important characteristic.

LIGHTING ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against certain steam railroad companies to compel

ayment for the sums expended by the District for the lighting of eets, avenues, alleys and, ground under the direction and control of e commissioners, under, over, and bordering on their several rights way, in accordance with acts of Congress, made and provided, has en affected by a ruling of the Court of Appeals of the District of olumbia, in Washington Terminal Co., appellant, *v.* District of olumbia, No. 3145, decided May 3, 1920, in which a judgment of the upreme Court of the District of Columbia, at law, No. 54253, entered on a verdict for plaintiff, District of Columbia, was reversed, the gher court ruling, in effect and inter alia, that the act of Congress May 26, 1908, in so far as it requires the Washington Terminal o. to pay for the lighting of streets, avenues, etc., over and under hich its right of way may cross is constitutional and valid, but not to the requirement that the company shall pay for the lighting of reets, etc., bordering on its right of way.

This necessitates a new trial of this suit. Other suits of similar ature pending have not been pressed, awaiting the outcome of the se referred to. An additional suit has been entered on newly crued claims in the light of the ruling referred to.

There appears now a fair prospect of recovery on just claims, ggregating many thousands of dollars.

SIGNAL SYSTEMS.

The fire-alarm telegraph, police-patrol signal, and the telephone ystems have been operated and maintained and each has expanded lightly in the line of natural growth.

Fire alarm boxes added to the system numbered 22 (17 public nd 5 private), and 2 private boxes were discontinued, a net increase f 20, to a total in service June 30, 1920, of 695. Fire alarm boxes onnected by underground wires were increased by 22 to a total of 95, including 467 on street posts, and boxes connected by overhead ires decreased by 2 to a total of 100.

The average annual rate of increase in number of fire alarm boxes onnected to the system should be augmented to bring this protective ervice to the generally accepted standard.

While the equipment in the "congested value" district and in he thickly built-up sections generally is above serious criticism, the ame can not be said of outlying suburban territory. A more generous ppropriation for a term of years to meet this condition is among he many needs.

The number of fire alarms received and transmitted through fire larm headquarters was 1,815, compared with 2,248 in the preeding year; this includes 22 "additional" alarms (second, third, and ourth), compared with 24 in the preceding year; it also includes 51 "false" alarms, compared with 292 in the preceding year.

As a very material step toward meeting the requirement of additional apparatus in fire alarm headquarters, due to the fact that the xisting box circuits, 30 in number, are on the average overloaded, a ontract has been made for the manufacture and delivery of switchboard apparatus to provide for 10 additional box circuits. It is the purpose to make the necessary alterations in arrangement of existing pparatus to accommodate the new, and to erect and connect the

new, almost exclusively with the regular staff of employees. This contract is in the sum of $5,560, and covers the first increase of apparatus since moving into the present quarters in 1908.

The number of police patrol boxes added was 4 (all connected underground), compared with 3 (2 overhead, 1 underground) in the previous year, bringing the total connected June 30, 1920, to 464. Of these, 373 are connected on underground wires and 91 on overhead. This important service is but little below a fair standard of requirement; though somewhat sacrificed in the war period, moderate continuing appropriations bid fair to supply the visible needs.

The number of telephones added on the two switchboards in the jurisdiction of this department was 27 and 8 were discontinued, a net increase of 19, compared with 26 for the preceding year. The total of telephones on District of Columbia systems was increased by 34 to a total connected June 30, 1920, of 1,391.

The District of Columbia telephone system, while consisting of private branch exchanges connected with the Chesapeake & Potomac Telephone Co.'s central exchange system, is peculiar in that the District owns and maintains its own distributing system and much accessory apparatus, in consequence paying a relatively small annual rate for telephone instruments in lieu of the much larger charge for stations.

The number of cells of storage battery connected on fire alarm, police patrol, and local circuits remains unchanged at 2,174.

The distribution equipment for the composite signal systems has been affected as follows:

Underground wires.—Installed, 4.18 miles of cable containing 86.86 miles of conductor; withdrawn, 0.678 mile cable, 29.02 miles conductor; in service June 30, 1920, 161.68 miles cable, 6,359.05 miles conductor; a net increase of 57.84 miles of conductor.

Overhead wires.—Installed, 3.09 miles conductor; withdrawn, 11.19 miles conductor; in service June 30, 1920, 156.61 miles conductor; a net decrease of 8.1 miles conductor.

Grand total of composite distribution, 6,515.66 miles of conductor.

This distribution system has less than sufficient reserve capacity, and any considerable public building program would immediately be reflected in need of material expansion thereof.

INSPECTION OF ELECTRIC WIRES AND APPARATUS.

The regulation of production, distribution, and utilization of electric current for heat, light, and power purposes and the regulation of the use of telegraph wires and of telephone wires in the District of Columbia have an important bearing upon the safety and convenience of the public. Safety to life and limb, fire hazard, orderly condition of highways and by-ways, and the life of underground metallic structures, public and private, are all involved. This service has been rendered in the past year not in perfection, but marvelously well considering the conditions. It was cited in last report that "an increase of this inspection force appears essential." The expression was too mild when made and was made with an optimism as to rapid "return to normalcy" not justified. An increase of personnel and further relief as to compensation are necessary to the maintenance of the service on a proper standard of efficiency. It is not alone the growth in volume of business which affects the situation.

e growing average of distances from base, the growing complexity installations, the tremendous growth in the use of household appli-es, and the tendency to apply and use these in ways involving ard, the war-time effect on the average of skill, competency, and rale of workmen of the industry, all tend to the result that an in-ctor can not make in adequate and proper manner as many inspec-ns per day as formerly. Inadequacy of service soon results in ttention to and contempt of the regulations and might soon be lected in property insurance rates.

The total of permits issued for installation of wires and apparatus private property was 6,099, compared with 3,409 in the previous r, an increase of 2,690, or practically 79 per cent.

Fees paid to the collector of taxes, $10,596, compared with $5,709.30, increase of $4,886.70, or nearly 86 per cent.

Number of inspections recorded, 14,965, compared with 11,837, an rease of 3,128, or but little over 26 per cent. The relation of this centage to those preceding, notwithstanding extraordinary efforts the inspectors and much overtime work, reflects the limit of physi-possibility and forecasts inspections, not perfunctory, but in-quate.

Supervision was exercised over the erection, taking down, moving, lacing, or resetting of an aggregate of 2,014 line and guy poles d of 229 pole anchors, and of the stringing of overhead wires in-lent to this pole work and a multiplicity of wire-stringing jobs t involving such work on poles, house connections, etc. The total recorded wire-supporting poles in the District is: Line, 18,600; y, 1,056; total, 19,656, compared with a total of 19,104 at the end the preceding year, a net increase of 552, or less than 3 per cent.

The operations of the Chesapeake & Potomac Telephone Co. in e matter of poles and overhead wires, in conformity with the t of Congress approved June 30, 1902, regulating the use of tele-one wires in the District of Columbia, are noteworthy and com-endable. That company has not only decreased by 7 the number of poles in streets within the area prescribed in that act, but it has so decreased by 11 the number of its poles in streets outside of that ea, while growth of its distribution equipment is partly shown by e fact that it has increased by 233 the number of its poles in alleys. s extensions of underground conduit system have obviously been r beyond those induced by legislative restriction.

MISCELLANEOUS WORK.

The service of this department, in cooperation with the municipal chitect or for other District departments or divisions, in preparing ans and specifications for and in supervision of electric wiring, c., has been, for the year, relatively limited. Modifications and ad-tions to the wiring in three existing schools and the restoration damaged wiring at the municipal asphalt plant constitute the mpleted work, and plans and specifications for the proposed ngdon-Woodridge School and for improvements in lighting the ublic Library are the unfinished work. Numerous incidents, minor

projects, and troubles in connection with District buildings have had the necessary attention and all possible service therein rendered.

PERSONNEL.

I wish to record my deep appreciation of the loyal service and faithful cooperation of the employees in this department. Recommendations have been made elsewhere, but I will add here that from high to low, due to love of the service, faith and hope are still reckoned in the compensation.

Respectfully,

WARREN B. HADLEY,
Electrical Engineer.

To the ASSISTANT ENGINEER COMMISSIONER.

Lamps of all kinds in service June 30, 1920, as compared with June 30, 1919.

Kind of light.	1919	1920	Kind of light.	1919	1920
Mantle gas	10,431	10,556	Electric incandescent—Contd.		
Electric arc:			60-candlepower, series	3,637	3,773
6.6-ampere magnetite	280	282	60-candlepower, multiple	318	319
4-ampere magnetite	515	502	Street designation lamps:		
Electric incandescent:			Gas	394	391
250-candlepower, series	10	10	Electric	131	144
200-candlepower, multiple	64	64			
100-candlepower, series	3,772	3,839	Total	19,650	20,000
100-candlepower, multiple	98	120			

Net increase during year, 350 lamps.

Changes in the various forms of street lighting during the year.

Kind of light.	Added.	Discontinued.	Kind of light.	Added.	Discontinued.
Mantle gas	133	[1] 8	Electric incandescent—Contd.		
Electric arc:			60-candlepower, multiple	1	.....
6.6-ampere magnetite	2	.....	Street designation lamps:		
4-ampere magnetite	.....	[2] 13	Gas	4	[3] 7
Electric incandescent:			Electric	13	.....
100-candlepower, series	67	.....			
100-candlepower, multiple	22	.....	Total	378	28
60-candlepower, series	136	.....			

[1] Of this number, 5 were replaced by 100-candlepower incandescent electric lamps and 1 by 60-candlepower incandescent electric lamp.
[2] These 13 lamps were replaced by 100-candlepower incandescent electric lamps.
[3] These 7 lamps were replaced by 8-candlepower incandescent electric lamps.

Summary of changes.

Net increase in number of lamps	350
Discontinued	26
Replaced by other kinds	2
Total changes	378

INSTALLED.

Size of cable.	Signal.		Telephone.			Composite—signal and telephone.					Total.			
	Cable.	Conductors No. 14.	Cable.	Conductors.		Cable.	Conductors.				Cable.	Conductors.		
				No. 19.	No. 22.		No. 14.		No. 19.			No. 14.	No. 19.	No. 22.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pairs.*	*Feet.*	*Pairs.*	*Feet.*	*Feet.*	*Feet.*	*Feet*	*Feet.*
35-pair						1,148	15	34,440	20	45,920	1,148	34,440	45,920	
15-pair						741	6	8,892	9	13,338	741	8,892	13,338	
12-pair						4,305	6	51,660	6	51,660	4,305	51,660	51,660	
8-pair						15,722	4	125,766	4	125,766	15,722	125,766	125,766	
5-pair						100	3	600	2	400	100	600	400	
3-pair						32	2	128	1	64	32	128	64	
Total						22,048		221,486		237,148	22,048	221,486	237,148	

WITHDRAWN.

35-pair						1,594	15	47,820	20	63,760	1,594	47,820	63,760	
12-pair						1,234	6	14,808	6	14,808	1,234	14,808	14,808	
8-pair						751	4	6,008	4	6,008	751	6,008	6,008	
Total						3,579		68,636		84,576	3,579	68,636	84,576	

IN SERVICE JUNE 30, 1920.

150-pair			7,941		2,382,300						7,941			2,382,300
100-pair			2,310		462,000						2,310			462,000
100-pair			10,812	2,162,400							10,812		2,162,400	
90-pair						480	30	28,800	60	57,600	480	28,800	57,600	
80-pair						4,503	30	270,180	50	450,300	4,503	270,180	450,300	
75-pair			4,275	641,250							4,275		641,250	
70-pair						1,857	30	111,420	40	148,560	1,857	111,420	148,560	
65-pair						2,785	15	83,550	50	278,500	2,785	83,550	278,500	
60-pair			250	30,000		2,940	30	176,400	30	176,400	3,190	176,400	206,400	
5-pair						11,401	15	342,030	40	912,080	11,401	342,030	912,080	

District of Columbia cable installed and withdrawn during the year and amount in service June 30, 1920—Continued.

IN SERVICE JUNE 30, 1920—Continued.

Size of cable.	Signal.		Telephone.			Composite—signal and telephone.					Total.			
	Cable.	Conductors No. 14.	Cable.	Conductors.		Cable.	Conductors.				Cable.	Conductors.		
				No. 19.	No. 22.		No. 14.		No. 19.			No. 14.	No. 19.	No. 22.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pairs.*	*Feet.*	*Pairs.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
50-pair	2,533	253,300	16,604	1,449,000	211,400						19,137	253,300	1,449,000	211,400
45-pair						6,214	20	248,560	25	310,700	6,214	248,560	310,700	
45-pair						21,037	15	631,110	30	1,262,220	21,037	631,110	1,262,220	
40-pair						7,542	15	226,260	25	377,100	7,542	226,260	377,100	
35-pair						23,321	15	699,630	20	932,840	23,321	699,630	932,840	
35-pair						1,938	10	38,760	25	96,900	1,938	38,760	96,900	
33-pair						4,633	17	157,522	16	148,256	4,633	157,522	148,256	
30-pair	13,019	781,140	4,179	250,740		574	15	17,220	15	17,220	17,772	798,360	267,960	
30-pair						68,618	10	1,372,360	20	2,744,720	68,618	1,372,360	2,744,720	
25-pair			20,010	1,000,500		25,389	10	507,780	15	761,670	45,399	507,780	1,762,170	
20-pair			12,071	482,840		24,517	10	490,340	10	490,340	36,588	490,340	973,180	
18-pair						5,494	8	87,904	10	109,880	5,494	87,904	109,880	
15-pair	19,247	577,410	3,652	109,560		7,786	8	124,576	7	109,004	30,685	701,986	218,564	
15-pair						741	6	8,892	9	13,338	741	8,892	13,338	
14-pair						7,016	6	84,192	8	112,256	7,016	84,192	112,256	
12-pair	12,489	299,736				79,143	6	949,816	6	949,816	91,632	1,249,552	949,816	
10-pair	570	11,400				24,791	5	247,910	5	247,910	25,361	259,310	247,910	
8-pair						234,279	4	1,874,222	4	1,874,222	234,279	1,874,222	1,874,222	
6-pair						5,984	4	47,872	2	23,936	5,984	47,872	23,936	
5-pair						33,467	3	200,802	2	133,868	33,467	200,802	133,868	
3-pair						117,242	2	468,968	1	234,102	117,242	468,968	234,102	
Total	47,858	1,922,986	82,104	6,126,200	3,055,700	723,692		9,497,076		12,973,738	853,654	11,420,062	19,100,028	3,055,700

Installed 4.18 miles of cable containing 86.86 miles of conductors: withdrawn, 0.678 mile of cable containing 29.02 miles of conductor; in service June 30, 1920, 161.68 miles of cable containing 6,359.05 miles of conductor. Conductor sizes above specified are by B. & S. (Brown and Sharp's) or American Wire Gauge.

Amount of space occupied by District of Columbia cable installed during year and that in service June 30, 1920.

Ownership of conduit.	Space occupied by cable.		
	Installed during year.	Withdrawn during year.	In service June 30, 1920.
	Feet.	*Feet.*	*Feet.*
District of Columbia	3,711	.....	206,926
Chesapeake & Potomac Telephone Co	15,832	3,439	593,742
Washington Railway & Electric Co.[1]	60	140	32,343
United States Government	2,445	.....	5,929
Western Union Telegraph Co	.....	.....	7,180
Washington Terminal Co	.....	.....	1,019
Submarine cable	.....	.....	150
Placed in parking	.....	.....	2,997
Miscellaneous	.....	.....	3,368
Total	22,048	3,579	853,654

[1] Under this name are included the conduits of all companies controlled by this corporation.

Material cable installed and withdrawn during the year and amount in service June 30, 1920.

INSTALLED.

Size of cable.	Cables.	Combination.			
		No. 14.		No. 19.	
		Pair.	Conductors.	Pair.	Conductors.
	Feet.	*No.*	*Feet.*	*No.*	*Feet.*
10-pair	408	10	8,160	10	8,160

WITHDRAWN.

15-pair	1,969	6	23,628	9	35,442

IN SERVICE JUNE 30, 1920.

25-pair	7,358	10	147,160	15	220,740
20-pair	408	10	8,160	10	8,160
15-pair	6,656	6	79,872	9	119,808
12-pair	9,558	6	114,696	6	114,696
8-pair	852	4	6,816	4	6,816
Total	24,832	.....	356,704	.....	470,220

In service June 30, 1920, 4.70 miles of cable containing 156.61 miles of conductor.

TELEPHONE SYSTEM.

The following 27 telephones were added to the two switchboards of the department during the year:

DISTRICT BUILDING.

Office of Board of Children's Guardians, room 20 1
Office of Sanitary Engineer, extension, room 305 1

OUTSIDE OFFICES.

Board of Police and Fire Surgeons, 409 Fifteenth Street NW	1
Police Court Building, offices of the judges and clerk	6
Assistant corporation counsel, police court, extension	1
Engineer of Highways, temporary storage yard, square 361, Ninth Street and Vermont Avenue, T and U Streets NW	1
Residence of Inspector D. M. Koontz, street cleaning, city refuse division, 1422 Minnesota Avenue SE	1

PUBLIC SCHOOLS.

Tyler School	1
Old M Street High School	1
Grover Cleveland School	1
Carberry School	1
Old Central High School	1
Eastern High School	1
Portable School, Eighteenth and Monroe Streets NE	1
Blow School	1
Public School of Household Art, 1201 K Street NE	1
Junior High School, Old Central High School Building	1
Sumner School	1
John Eaton School	1
Berrett School	1
Mott School, extension	1
Emery School, extension	1

The following eight telephones on these switchboards were discontinued during the year:

DISTRICT BUIDING.

Selective Military Service local board No. 2, room 20	1

OUTSIDE OFFICE.

Contract office and construction department, Potomac Electric Power Co	2

PUBLIC SCHOOLS.

Old M Street High School	2
Franklin School	1
Curtis School	1
Atypical School, 1407 Thirty-third Street NW	1

Fire Department Switchboard.—Two telephones, extensions, were discontinued during the year.

Police Department switchboard.—Four telephones were added to this switchboard during the year.

Water Department switchboard.—Two telephones were added to this switchboard during the year.

Franklin School switchboard.—One telephone was added to this switchboard during the year.

Washington Asylum and Jail switchboard.—Two telephones were added to this switchboard during the year.

Miner Normal School switchboard.—One telephone was added to this switchboard during the year.

Dunbar High School switchboard.—Two telephones were added to this switchboard during the year.

Number of telephones connected to the District system, June 30, 1920.

Offices of the District Building	197
Outside offices and institutions	102
Residences	4
Public schools	232
Fire department	55

lepartment	64
department, private branch exchange	44
n School, private branch exchange	88
n High School, private branch exchange	17
ey Manual Training School, private branch exchange	17
Ormond Wilson Normal School, private branch exchange	80
Normal School, private branch exchange	13
entral High School, private branch exchange	36
high school, private branch exchange	20
Library, private branch exchange	21
igton Asylum and Jail, private branch exchange	19
t Repair Shop, private branch exchange	6
ge Pumping Station, private branch exchange	7
patrol service	469
Total	1,391

e are 27 portable telephone sets in service, the property of the District imbia. These instruments are used by the fire department and the em- of the electrical department.

Storage-battery system.

umber of cells of storage battery in service June 30, 1920, was as follows:

-alarm circuits	1,862
rol circuits	226
il circuits	86
Total	2,174

DISTRICT UNDERGROUND CONDUIT CABLE SYSTEM.

following conduit connections were made to the underground i:

Fire-alarm posts (total, 22).

r-fifth and Hamlin Streets NE.
i and South Dakota Avenues
eenth and Kearney Streets NE.
enth and Jackson Streets NE.
enth and Lawrence Streets NE.
ith Street and Rhode Island ue NE.
Island Avenue and Monroe et NE.
eet between Half and South tol Street SW.
th and U Streets NW.
Pleasant and Hobart Street
Fifteenth and Harvard Streets NW.
Thirty-fifth and Macomb Streets NW.
Thirty-fourth and Lowell Streets NW.
Sixteenth and K Streets NW.
Ninth and U Streets NW.
Shepherd Street and Kansas Avenue NW.
Rhode Island Avenue between 5th and 6th Streets NE.
First Street and Pennsylvania Avenue NW.
Ninth and D Streets SW.
Fifth and B Streets NE.
Tennessee Avenue and D Street NE.
Twenty-fifth and I Streets NW.

Patrol posts (total, 4).

Dakota Avenue and Hamlin et NE.
Island Avenue and Monroe et NE.
Florida Avenue and Orren Street NE.
Tennessee Avenue and D Street NE.

Connections to buildings (total, 3).

lley between Thirteenth and Fourteenth, D and E Streets SE.
enteenth and M Streets NW.
Street near Seventeenth Street NW.

Connections between conduits (total, 1).

Eleventh and U Streets, NW.

Conduit extensions (total, 1).

South Dakota Avenue between Bladensburg Road and railroad bridge NE.

In making the above-mentioned connections and extensions 6,885 feet of conduit (duct feet) were constructed, the work being done by this department.

Connections to the underground system, June 30, 1920.

Fire-alarm posts	467	Fire-department houses	34
Police patrol posts	358	Police station houses	13
Cable terminal posts	6	Miscellaneous district buildings	19
U. S. Government buildings	24	Cable poles	68
Private buildings	62		
Schoolhouses	82	Total	1,133

POLICE PATROL SYSTEM.

The following new installations, connected underground, were made in the patrol system:

Ninth precinct.—Box No. 72, South Dakota Avenue and Hamlin Street NE.; Box No. 63, Tennessee Avenue and D Street NE.; Box No. 48, Florida Avenue and Orren Street NE.; Box No. 71, Twenty-eighth Street and Rhode Island Avenue NE.

On June 30, 1920, the distribution of boxes among the precincts was as follows:

	Wall boxes.		Booths.	Total.
	Underground.	Overhead.		
First	37			37
Second	27			27
Third	50			50
Fourth	37	2		39
Fifth	44	2		46
Sixth	29			29
Seventh	22	3		25
Eighth	27			27
Ninth	38	18		56
Tenth	49	10	1	60
Eleventh	3	34	1	38
Subprecinct, Tenleytown	10	19	1	30
Total	[1] 373	88	3	464

[1] Six of these boxes at following locations are not on posts: 3, Union Station; 1, engineer stables, First and Canal Streets; 1, Takoma Park, watch box; 1, Treasury Department.

FIRE-ALARM SYSTEM.

Twenty-two fire-alarm boxes were placed in service during the years—17 public and 5 private boxes—located as follows:

Public boxes.

No. 113 First Street and Pennsylvania Avenue NW.
No. 293 Eleventh and U Streets NW.
No. 294 Ninth and U Streets NW.
No. 358 Sixteenth and K Streets NW.
No. 365 Twenty-fifth and I Streets NW.
No. 465 Ninth and D Streets SW.
No. 741 Thirty-fourth and Lowell Streets NW.
No. 742 Thirty-fifth and Macomb Streets NW.
No. 6124 Fifth and B Streets NE.
No. 6125 Tennessee Avenue and D Street NE.
No. 6173 Rhode Island Avenue between Fifth and Sixth Streets NE.
No. 6174 Sixteenth Street and Rhode Island Avenue NE.
No. 6176 Twenty-fifth and Hamlin Streets NE.
No. 6192 Twenty-eighth Street and Rhode Island Avenue NE.
No. 8162 Fifteenth and Harvard Streets NW.
No. 8163 Mount Pleasant and Hobart Streets NW.
No. 8173 Kansas Avenue and Shepherd Street NW.

Private boxes.

No. 362 State, War, and Navy Building.
No. 454 Norfolk & Washington Steamboat Co., Seventh Street Wharf.
No. 466 United States Arsenal.
No. 573 Carry Ice Cream Plant.
No. 1275 New Arlington Building, Vermont Avenue between H and I Streets NW.

Two private boxes, No. 422, located at the Safety Oil Co. Building, Half and K Streets SW., and No. 491, located at Department of Agriculture, Bureau of Farm Management, 224 Twelfth Street SW., were discontinued during the year.

During the year three boxes were changed from overhead to underground connection.

Fire-alarm boxes in service.

	July 1, 1919.	June 30, 1920.
Connected by overhead wires:		
Public boxes	80	79
Private boxes	22	21
Connected by underground wires:		
Public boxes	445	463
Private boxes	128	132
Total	675	695

Alarms received and transmitted:

Regular box alarms	826
Alarms received from telephone stations	5
Local alarms	962
Second alarms	13
Third alarms	7
Fourth alarms	2
Fifth alarms	0
Sixth alarms	0
Total	1,815
False box alarms	110
False local alarms	41

Each fire-alarm box was tested several times during the year, the contact points cleaned and the mechanism overhauled. This is done

regularly once a month as far as possible. The total number of tests amounted to 4,579 being an average of 6.59 per box.

Alarms received by the month.

	Box.		Local.		Additional alarms.
	Number.	False.	Number.	False.	
1919.					
July	59	11	60	.....	.....
August	56	8	48	2	.....
September	56	8	51	2	.....
October	50	11	44	1	1
November	81	16	81	2	1
December	96	4	119	6	4
1920.					
January	84	11	107	2	4
February	69	7	68	3	.....
March	101	6	164	8	5
April	74	12	107	11	1
May	59	10	66	3	3
June	46	6	47	1	3
Total	831	110	962	41	22

POLES.

Under the authority of the act of Congress approved June 30, 1902, regulating the use of telephone wires in the District of Columbia, the Chesapeake & Potomac Telephone Co. has reported the following amount of work done during the fiscal year:

Poles erected in streets within the prescribed area:		
Line	5	
Guy	1	
Anchors	2	
		8
Poles erected in alleys within the prescribed area:		
Line	49	
Guy	15	
Anchors	21	
		85
Poles erected in streets outside the prescribed area:		
Line	108	
Guy	8	
Anchors	42	
		158
Poles erected in alleys outside the prescribed area:		
Line	215	
Guy	41	
Anchors	123	
		379
Total		630
Poles taken down in streets within the prescribed area:		
Line	12	
Guy	1	
		13
Poles taken down in alleys within the prescribed area:		
Line	40	
Guy	7	
Anchors	8	
		55

Poles taken down in streets outside the prescribed area:		
Line	124	
Guy	3	
Anchors	1	
		128
Poles taken down in alleys outside the prescribed area:		
Line	37	
Guy	3	
Anchors	19	
		59
Total		255
Total erected during the year		630
Total taken down during the year		255
Net increase		375

Miscellaneous pole work—Poles erected, taken down, moved, etc.

	Erected.			Taken down.			Moved.		Replaced.		Reset.		Increase.		Decrease.	
	Line.	Guy.	Anchor.	Line.	Guy.	Anchor.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.
Chesapeake & Potomac Telephone Co	377	65	188	213	14	28	69	1	170	7	27	1	164	51	....	....
Potomac Electric Power Co.	403	27	6	24	7	6	81	....	375	5	10	....	379	20	....	....
District of Columbia	11	....	....	....	....	....	....	....	....	....	....	....	11	....	....	....
Western Union Telegraph Co	....	....	....	74	3	....	....	....	4	....	....	....	....	....	74	3
City & Suburban Railway Co	....	2	....	....	....	....	....	....	4	....	....	....	....	2	....	....
Columbia Railway Co	....	....	....	....	....	....	....	....	9	17	....	....	....	....	....	....
Georgetown & Tennallytown Railway Co	....	....	....	....	....	....	....	....	4	....	....	....	....	....	....	....
Brightwood Railway Co	....	2	....	....	....	1	4	....	4	....	....	....	....	2	....	....
Total	791	96	194	311	24	35	154	1	570	29	37	1	554	75	74	3

List of poles of all kinds, June 30, 1920.

	Line.	Guy.	Total.
District of Columbia	471	13	484
United States Government	297	1	298
Chesapeake & Potomac Telephone Co	6,621	739	7,360
Potomac Electric Power Co	7,020	279	7,299
Western Union Telegraph Co	835	.....	835
Postal Telegraph-Cable Co	355	9	364
Baltimore & Washington Transit Co	30	.....	30
Capital Traction Co	204	.....	204
City & Suburban Railway Co	87	4	91
Washington & Great Falls Railroad Co	401	1	402
Columbia Railway Co	463	4	467
Steam railroads	545	.....	545
Washington & Maryland Railway Co	158	.....	158
Georgetown & Tennallytown Railway Co	304	.....	304
Washington Interurban Railroad Co	187	4	191
East Washington Heights Traction Railway Co	65	.....	65
Brightwood Railway Co	341	2	343
Washington & Glen Echo Railway Co	8	.....	8
Capital Railway Co	208	.....	208
Total	18,600	1,056	19,656

ELECTRICAL WIRING INSPECTIONS.

The following tables show the amount of work performed by this department in connection with electric wiring inspections:

Notices received from the inspector of buildings of permits indicating electric wiring:	
Building	1,119
Machinery	154
Signs	17
Total	1,290
Permits issued by the electrical department for installations:	
Without fee (ordered by District of Columbia, etc.)	33
Covered by building permits	1,765
Not covered by building permits	4,115
For temporary work	58
Quarterly (maintenance of plants, etc.)	68
Total	6,099
Temporary use of current	358
Total	6,457
Certificates issued:	
Final (including 32 without fee)	4,255

Lamps and apparatus installed.	Number.	Approximate kilowatts.
Lamps, incandescent	81,825	3,273
Lamps, arc	7	11
Motors	505	4,516
Devices, miscellaneous	5,715	1,000
Blank outlets	279	.....
Total	88,331	8,800

Defective wiring discovered and reported by inspectors, extra of routine inspection work	382
Number of notices of defective wiring sent	1,452
Requests for inspection (not related to work already under permit)	10
Miscellaneous jackets (specifications, etc., for District of Columbia work, etc.)	381
Notices received from the superintendent of licenses, leading to original inspection of periodic (annual) reinspection of theaters, hotels, assembly halls, etc	104
Work of inspectors of electric wiring from July 1, 1919, to June 30, 1920:	
Inspections in private buildngs (not including theaters and moving-picture theaters)	14,230
Inspections in municpal buildings	168
Inspections in United States Government buildings	4
Inspections in theaters (including moving-picture theaters) including reinspections, periodic (annual) and occasional, of moving-picture theaters (more frequent periodic inspections being made by the fire marshal), and periodic reinspections (weekly or more frequently if bill changes) of theaters	563
Total	14,965
Fees paid to the collector of taxes:	
For permits	$10,596
Electrical wiring rules and regulations issued without fees	1

MISCELLANEOUS WORK.

This department prepared plans and specifications for and supervised the introduction of electric wiring in the following municipal properties:

COMPLETED WORK.

Curtis School, feeder from Addison School.

James Ormond Wilson Normal School, wiring for community center room and rewiring moving-picture machine.

Industrial Home School for Colored Children, motor wiring in shop.

Asphalt Plant, wiring.

SPECIFICATIONS PREPARED—WORK NOT STARTED.

Langdon-Woodridge School, wiring.

Public Library, wiring.

General supplies.

RECEIPTS.

Appropriation	$20,000.00
Repayments	1,545.97
Total	21,545.97

EXPENDITURES.

Labor pay roll	1,961.36
Telephone rental, etc	12,461.68
Wire and cable	1,353.62
Batteries and battery supplies	1,194.41
Office expenses	973.64
Instruments and apparatus	797.08
Allowances for maintenance of automobiles	720.00
Fire-alarm boxes	654.50
Line supplies	341.71
Maintenance of fire-alarm apparatus	340.44
Patrol-box locks and keys	192.72
Tools and hardware	114.72
Bicycles, purchase and repairs	101.35
Car tickets	50.00
Storeroom expenses	45.92
Repairing lanterns	16.00
Repairs to cuts	11.73
Expressage, etc	6.28
Truck hire	31.35
Miscellaneous items	4.20
Total	21,372.71

Lighting.

RECEIPTS.

Appropriation	$415,000.00
Repayments by Baltimore & Ohio Railroad Co	350.65
Repayments by Georgetown Barge, Dock, Elevator & Railroad Co	529.17
Repayments by Washington Terminal Co.[1]	3,537.26

Repayments by Philadelphia, Baltimore & Washington Railroad Co.[1]		$5,822.71
Repayments, miscellaneous		15.06
Total		425,254.85

EXPENDITURES.

Mantle gas lighting:		
Washington Gas Light Co	$170,100.35	
Deductions for defective service	397.07	
		169,703.28
Georgetown Gas Light Co	10,527.58	
Deductions for defective service	246.02	
		10,281.56
Incandescent electric lighting:		
Potomac Electric Power Co	149,721.93	
Deduction for defective service	1,525.61	
		148,196.32
Electric arc lighting:		
Potomac Electric Power Co	63,534.64	
Deductions, commissioner's order July 15, 1915	1,806.48	
Deductions for defective service	1,307.82	
		60,420.34
Street designation lighting:		
Washington Gas Light Co	3,667.95	
Deductions for defective service	2.83	
		3,665.12
Georgetown Gas Light Co	259.98	
Deductions for defective service	.95	
		259.03
Potomac Electric Power Co	1,372.08	
Deductions for defective service	.96	
		1,371.12
Labor pay roll		4,017.96
Lamp-posts, globes, etc		15,143.63
Fire-alarm lantern signs		553.00
Car tickets		330.75
Paints, oils, etc		272.34
Forage		232.75
Erecting, moving, and taking down posts		246.50
Patterns		67.00
Repairing lanterns		37.50
Street sign frames, etc		92.41
Baist atlas		50.00
Team hire		115.20
Tools and hardware		30.80
Repairs to cuts		28.35
Storeroom expenses		22.33
Blue printing		13.77
Street-crossing lighting		268.32
Allotment District of Columbia repair shop		50.71
Allotment Inspector Dawson		101.41
Allotment upkeep engineer department stables		36.14
Traveling expenses		75.53
Miscellaneous		73.71
Total		415,756.88

Wires underground.

RECEIPTS.

Appropriation	$4,000.00
Repayments	24.37
Total	4,024.37

[1] Due but not paid.

EXPENDITURES.

or pay roll	$1,749.39
e and cable	1,224.08
e supplies	738.71
airs to cuts	187.95
ck hire	49.50
ls and hardware	46.70
cellaneous	5.02
Total	4,001.35

Extension police patrol.

RECEIPTS.

ropriation	$1,000.00

EXPENDITURES.

or pay roll	301.82
le	565.20
e supplies	39.25
rol box equipment	21.75
Total	928.02

Fire-alarm boxes.

RECEIPTS.

propriation	$5,000.00

EXPENDITURES.

or pay roll	434.48
e-alarm boxes	2,272.50
le	1,188.00
airs to cuts	288.59
e supplies	109.02
cellaneous	14.62
Total	4,307.21

Fire-alarm apparatus.

RECEIPTS.

ropriation	$6,000.00

EXPENDITURES.

-alarm switchboard apparatus	5,535.00
rices of on inspecting engineer	25.00
tment for structural changes of rooms	400.00
Total	5,960.00

PORT OF THE CHIEF CLERK OF THE ENGINEER DEPARTMENT.

WASHINGTON, *September 3, 1920.*

IR: I have the honor to submit the following report of operations his office for the fiscal year ended June 30, 1920:

	1919	1920
munications received, briefed, recorded, and indexed	10,805	14,376
hers prepared and recorded	315	400
racts drawn and indexed	200	251
ls approved and indexed	285	357

ROLAND M. BRENNAN,
Chief Clerk, Engineer Department.

The ENGINEER COMMISSIONER.

REPORT OF WHARF COMMITTEE.

WASHINGTON, *September 10, 1920.*

SIR: The wharf committee has the honor to submit the following report for the fiscal year ended June 30, 1920.

Accompanying is a list of wharf property now under lease. All leases which expired during the year, with the exception of the lease for the rent of the old ferry wharf, were renewed. The rentals are fixed by competitive bidding after public advertisement.

The greatest amount of wharf property is that along the Washington Channel of the Potomac River. This has a total frontage on the city side of 9,275 linear feet, of which 4,675 feet between the Army War College and the south curb line of N Street is under the jurisdiction of the Chief of Engineers United States Army, a portion of which is used for governmental purposes, while the remainder is under lease to private parties. Of the remaining 4,600 feet between the south curb line of N Street south and Fourteenth Street SW., 559 feet between Thirteenth and Fourteenth Streets is under the jurisdiction of the United States and 4,041 feet is under the jurisdiction of the Commissioners of the District of Columbia. Located along this frontage are the harbor police station, the dock of the harbor boat, the dock of the fire boat, the District morgue, a District property yard, and the municipal fish wharves and market. The frontage between Thirteenth and Fourteenth Streets is the site of the central heating, lighting, and power plant for furnishing heat, light, and power to governmental buildings. This plant has not yet been constructed.

Along the Anacostia River front, the United States Navy Yard occupies the frontage on the city side from Second to Eleventh Streets, and the sewage pumping station and yard occupies the frontage between First and Second Streets. At the foot of First Street is located the intake for the Capitol power plant. There are only two privately rented frontages. One of these is at Twelfth and N Streets SE., which is a part of the Anacostia Park and under the jurisdiction of the United States district engineer officer. The lease for this frontage is a temporary monthly lease at the pleasure of that officer. The other is the water frontage between the building lines of Q Street SE., leased to the Standard Oil Co.

Water frontage leased to private parties is used for the following purposes, namely: Wood yards, lumber yards, marine railways, commercial and pleasure boat traffic, and other commercial uses.

The wharf property along the Georgetown Channel of the Potomac River is under private control, with the exception of the foot of streets. The foot of one street only is under lease.

On March 22, 1920, the headhouse of the Norfolk & Washington Steamboat Co. was damaged by fire to the extent of approximately $20,000. The damage was repaired out of the proceeds from the fire insurance.

A dangerous brick wall between the District of Columbia Sand Wharf and the property under lease to the Capital Yacht Club was moved. A new fence was constructed along the river side of Water Street between the morgue and the old ferry wharf as a measure of public protection. The wharves of the Washington-Colonial Beach

Co. and the Mount Vernon & Marshall Hall Steamboat Co. have been strengthened by new construction. The wharf under lease to the Amusement Security Corporation has been almost entirely rebuilt.

The leases for the rent of wharf property provide that the lessee shall insure the premises demised against fire in the name of the Commissioners of the District of Columbia to the use and benefit of the United States in amounts satisfactory to the commissioners. In this connection, the wharf committee has endeavored to obtain policies representative of the reproductive value of wharves and structures under lease, after deducting from such value accrued depreciation. The efforts along this line have been very successful as may be observed from the fact that the aggregate of the policies has been increased since January 1, 1920, from $87,525 to $117,750.

Respectfully submitted.

ROLAND M. BRENNAN,
Chairman.
D. E. MCCOMB,
RUSSELL DEAN,
Wharf Committee.

The ENGINEER COMMISSIONER.

List of wharf property under lease June 30, 1920.

POTOMAC RIVER FRONT.

Name of lessee.	Location.	Expires.	Water frontage.	Area.	Rental per year.
			Lin. ft.	*Sq. ft.*	
Amusement Security Corporation.	Sec. 2, structures 11 to 21, inclusive, and land formerly occupied by 13 and 19.	June 15, 1925	198	35,600	$1,320.00
Capital Yacht Club	Foot of Ninth Street SW., between structures 39 and 41.	July 1, 1923	24	2,080	75.00
L. A. Clarke & Son	Sec. 2, structures 68 to 77, including 70½, foot of Tenth Street SW.	Aug. 1, 1923	280	45,000	1,500.00
Colonial Beach Co	Sec. 1, structures 26 to 30, inclusive, foot of N Street SW.	May 15, 1923	120	7,000	600.00
Cranford Paving Co	Foot of Thirty-first Street NW	Feb. 1, 1923	53	.....	534.60
J. Maury Dove Co. (Inc.).	Sec. 3, structures 12 to 20, foot of Thirteenth Street SW.	June 30, 1921	168	38,000	2,100.00
G. W. Forsberg	Sec. 2, structures 22 to 32, inclusive, foot of Eighth Street SW.	Mar. 14, 1922	.....	.....	733.00
Johnson & Wimsatt	Sec. 3, structures 5 to 11, inclusive, foot of Twelfth Street SW.	Mar. 15, 1923	190	43,500	2,244.00
Do	Sec. 2, structures 34 and 35, foot of Ninth Street SW.	.....do	80	18,000	720.00
Geo. E. Klein	Sec. 2, structures 39 and 40, foot of Ninth Street SW.	Mar. 14, 1924	40	2,400	110.00
Mount Vernon & Marshall Hall Steamboat Co.	Sec. 1, structures 59, 62, 63, and 64, foot of M Street SW.	Mar. 15, 1923	125	10,000	630.00
Norfolk & Washington Steamboat Co.	Sec. 1, structures 60 and 65 to 72, inclusive, foot of Seventh Street SW.	(1)	190	47,861	5,000.00
Wm. A. Ragan	Sec. 3, structures 21 and 22, foot of Thirteenth Street SW.	Mar. 15, 1921	65	4,200	100.00
Do	Sec. 3, structure 23, foot of Thirteenth Street SW.	May 1, 1921	18	1,440	50.00
Chas. E. Sanford et al.	Sec. 2, structures 36, 37, and 38, foot of Ninth Street SW.	Mar. 15, 1921	44	3,320	130.00
Jos. P. Stephenson, Stephenson & Bro.	Sec. 2, structures 1 to 10, inclusive, foot of Seventh Street SW.	Jan. 31, 1922	300	59,900	2,402.00
A. M. Suit	Wharf slip, foot of Ninth Street SW., between District sand wharf and Capital Yacht Club.	June 14, 1921	.....	.....	100.00

[1] From Feb. 1, 1920, to Jan. 31, 1925.

List of wharf property under lease June 30, 1920—Continued.

Name of lessee.	Location.	Expires.	Water frontage.	Area.	Rental per year.
			Lin. ft.	*Sq. ft.*	
Washington-Colonial Beach Co.	Sec. 1, structures 31 to 37, inclusive, Water Street between M and N Streets.	Mar. 15, 1923	132	8,000	$600.00
District of Columbia Municipal Fish Wharf and Market.	Sec. 2, structures 78 to 82, inclusive, and 85 to 97, inclusive, structures 98 to 129, inclusive.	.....	700	152,100	.....
Do	Sec. 3, structures 1 to 4, inclusive, Water Street between Tenth and Twelfth Streets SW.	.....	126	11,015	.....
Old ferry wharf	Sec. 1, structures 43 to 45–47 to 57	June 30, 1920 (not renewed).	.....	.....	720.00
Property yard	All water frontage on Water Street between H and I Streets SW.	.....	503	96,370	.....
Fire-boat wharf	Sec. 1, structures 39 and 40, Water Street between N and M Streets.	.....	.....	.....	.....
Morgue	Sec. 1, structures 41 and 42, Water Street between N and M.	.....	.....	.....	.....
Harbormaster's wharf	Sec. 1, structure 38, and sec. 2, slip between structures 41 and 42.	.....	.....	.....	.....
United States site of central heat and power plant.	Water Street between Thirteen-and-a-half and Fourteenth Streets SW.	.....	359	38,975	.....
Do	Sec. 3, structures 24 to 27, inclusive, foot of Thirteenth Street SW.	.....	200	26,600	.....
Total	.....	.....	.....	.....	19,668.60

ANACOSTIA RIVER FRONT (EASTERN BRANCH).

Edward S. Dean	Water front between lines of N Street SE.	Monthly	.....	.....	$67.50
Standard Oil Co	Water front between building lines of Q Street SE.	Dec. 31, 1920	.....	.....	255.00
District of Columbia sewer division.	Foot of First Street SE. opposite lot 1, square south of square 744.	.....	330	.....	.....
United States Superintendent of Capitol Buildings and Grounds.	Foot of First Street SE. opposite square south of square 744.	.....	40	.....	.....
Total	.....	.....	.....	.....	322.50

REPORT OF SUPERINTENDENT OF THE DISTRICT BUILDING.

WASHINGTON, *August 21, 1920.*

GENTLEMEN: I have the honor to submit the following report on the maintenance and repair of the District Building, together with the operation of the power plant, woodwork and paint shops, print and blue-print shops, and the electrictl department for the fiscal year 1920.

WOODWORK AND PAINT SHOP.

Room No. 24, formerly used by the field men of the surface department, was assigned by the commissioners to the playgrounds department. This necessitated the construction of a corridor room in the east corridor of the basement for the use of these men. The District Building now has at the end of each corridor on all floors, except the first floor west and the third floor east, a corridor room, constructed during the past few years, for the purpose of relieving congestion in various departments.

There was constructed, during the past fiscal year, an additional cashier's cage, together with the necessary railing, for use of the collector of taxes, at a total cost of $1,300. There was also constructed for the engineer of highways a partition in the fourth-floor hall at a cost of $90.

The women's toilet, located on the fifth floor of the District Building, was assigned by the commissioners to the electrical department for its use; it was remodeled to meet the department's requirements. The men's toilet on the fifth floor was divided, remodeled, and a new entrance erected.

The doors at the west and east entrances to the District Building were refinished, floors refinished, walls repainted and washed, railings and shelving erected, windows replaced, and all window frames and sills repainted, etc.

Because of age, repairs to windows, doors, shades, locks, blinds, desks, etc., have greatly increased.

POWER PLANT.

There was consumed 2,140.6 tons of coal (which ran 13 per cent ash), an excess of 226.1 tons as compared with the fiscal year ending June 30, 1919; our stokers were adjusted for the use of "New River" coal; it is therefore recommended that the District Building be supplied with a grade of coal containing a lower percentage of ash, "New River," or equal.

The total number of kilowatt-hours generated was 458,480, an excess of 28,403 kilowatt-hours as compared with the preceding year, due, no doubt, to the increased consumption by the health and electrical departments.

In addition to the routine work the repairing of the mechanical equipment of this department, including that of stoker and furnace, at a cost of $1,639.27, and the installation of new and repairs to old plumbing, at a cost of $1,616.35, was effected.

Because of deterioration of plumbing in the District Building, repairs are annually becoming more and more numerous; this work alone requires almost the entire time of one employee, supplied by the power plant, which is already insufficient to perform the duties imposed upon it; it is therefore recommended that Congress be asked to create the position of plumber, whose duties shall be the installation, maintenance, and repair of all plumbing in the District Building.

Operation of the refrigerating and ventilating plants and pneumatic-tube system, and necessary repairs, were taken care of by this department.

There were 594 cubic yards of ash removed at a cost of $534.60.

ELECTRICAL.

The electrical department, in addition to regular routine work, had installed 5,000 feet of ¾-inch iron cable on elevators and 1,560 feet of ½-inch steel rope on the safeties; 150 lighting fixtures were changed from the direct to semidirect; lamp renewals totaling $1,103.53, armature repairs totaling $235, necessary repairs to ele-

vators, and installation of and repairs to electric fans, etc., were made.

Electric current used by the various departments for other than lighting was as follows:

	Kilowatt hours.
Police department	2,713
Health department	110,017
Electrical department	770
Fire-alarm headquarters	30,625

PRINT SHOP.

Four hundred and forty-six orders for printing, totaling 1,466,402 pieces, at a cost of $8,557.16, were completed for the various departments of the District government.

BLUE-PRINT AND PHOTOGRAPH SHOP.

Thirty-three thousand eight hundred and sixty-six square feet of blue printing were completed at a cost of $1,255.24, and 502 photographs at a total cost of $294.88.

FRANK S. BESSON,
Major of Engineers, U. S. Army, Superintendent.

The COMMISSIONERS OF THE DISTRICT OF COLUMBIA
(Through the Engineer Commissioner).

REPORT OF THE BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS.

WASHINGTON, *September 30, 1920.*

GENTLEMEN: We have the honor to submit the following report for the year ended June 30, 1920.

Buildings on which action was taken in response to notices served under the act creating the board for the condemnation of insanitary buildings during the year ended June 30, 1920:

	Examined.	Demolished.	Repaired.	No action necessary.	Value of repairs.	Pending.
Buildings in streets	116	20	74	16	$45,655.00	6
Buildings in alleys	90	20	55	8	8,915.00	7
Buildings condemned under Sec. 16 of the Building Code (140),						
Buildings in streets	62	56	6	.....	.....	.....
Buildings in alleys	78	28	25	10	.....	15
Total	346	124	160	34	54,570.00	28

Buildings acted upon since the creation of the board for the condemnation of insanitary buildings up to and including June 30, 1920:

	Examined.	Demolished.	Repaired.	No action necessary.	Estimated value of repairs.
Buildings in streets	3,358	1,605	1,234	437	$64,695.00
Buildings in alleys	4,272	784	620	2,812	12,900.00
Total	7,630	2,389	1,854	3,249	77,595.00

Number of meetings of the board for the condemnation of insanitary buildings during the year ended June 30, 1920	5
Number of preliminary notices served during the year ended June 30, 1920	64
Number of condemnation notices served during the year ended June 30, 1920	15
Number of condemnation notices affixed to buildings	32
Number of condemnation notices served under sec. 16 of the Building Code	145
Inspection and miscellaneous visits made in connection with the service of notices	1,982
Estimated number of tenants required to secure other quarters through action on the part of board since its creation	6,645
Estimated number of tenants and occupants of insanitary buildings benefited by repairs during the year ended June 30, 1920	480
Estimated number of tenants and occupants of insanitary buildings benefited by repairs since the creation of the board	6,276

The study of the alley conditions of the city and a census has been taken of the inhabitants of the same; an inspection and enumeration has also been made of the alley buildings, their number and condition noted; there has also been prepared plats showing the number and character of the alley dwellings and other buildings located on the various alleys; also the character of the buildings facing on the street fronts of the squares which contain alley dwellings has been completed, with the following results noted:

Total number of alley dwellings	2,828
Total number of alley dwellings dilapidated	535
Total number of alley dwellings vacant	141
Total number of alley dwellings converted into garages	150
Total amount of rent per month for alley dwellings	$22,037.16
Average rent per house, alley, per month, northwest section	$8.15
Average rent per person per month, northwest section	$2.41
Average rent per alley house per month, southwest section	$6.59
Average rent per person per month, southwest section	$2.14
Average rent per alley house per month, northeast section	$9.34
Average rent per person per month, northeast section	$2.32
Average rent per alley house per month, southeast section	$6.29
Average rent per person per month, southeast section	$1.98
Total number of inhabitants in alleys	9,485
Approximate number of white people	500
Approximate number of colored people	9,000
Number of alleys which can be prolonged and made minor streets	80
Approximate number of people living in the 80 alleys which can be prolonged and made into minor streets	2,000

A great majority of alley dwellings at this time are very badly in need of repairs and are more or less in an insanitary condition, owing to the uncertainty of when the law requiring all alley dwellings to be vacated is to be put into effect, and also because of the very low rents collected for the greater number of the alley dwellings, as a result of which the owners do not feel justified in spending the necessary money to keep these houses in first-class condition.

The act of Congress approved September 25, 1914, declaring the use or occupation of any building or other structure erected or placed on or along any alley as a dwelling or residence or place of abode by any person or persons is injurious to life, to public health, morals, safety, and welfare of the District of Columbia, and such use or occupation of any such building or other structure on, from, and after the 1st day of July, 1918, shall be unlawful, was amended by an act of Congress approved May 23, 1918, which amendment provides

"that the operation of the second paragraph of section one (re ing to the use or occupation of alley buildings as dwellings) her is postponed until the expiration of one year following the date of proclamation by the President of the exchange of the ratificatio the treaty of peace between the United States and the Imperial (man Government."

CAREY H. BROWN,
Major, Corps of Engineers, U. S. A.,
Assistant to Engineer Commissione
W. C. FOWLER, M. D.,
Health Officer, District of Columbi
JOHN P. HEALY,
Inspector of Buildings, District of Columbia
Board for the Condemnation of Insanitary Building

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

APPENDIX.

SPECIFICATIONS FOR PAVING STREETS AND AVENUES WITH SHEET ASPHALT AND CONSTRUCTING CEMENT CONCRETE ROADWAYS.

INSTRUCTIONS TO BIDDERS.

1. These specifications will become a part of the contract.

2. *Signature.*—Proposals must be signed by the bidder with the signature in full. When a firm is a bidder, the agent who signs the firm name to the proposal shall state, in addition, the names of the individuals composing the firm. When a corporation is a bidder, the person signing shall state under the laws of what State the corporation was chartered, and the name and title of the officer having authority under the by-laws to sign contracts. The proposal shall also bear the seal of the corporation, attested by its secretary. Anyone signing the proposal as agent must file with it legal evidence of his authority so to do.

3. *Interpretation.*—Any doubt as to the meaning of these specifications will be explained by the Engineer, who shall have the right to correct any errors or omissions in them when such correction is necessary for the proper fulfillment of their intention. Whenever the word "Commissioners" is used in these specifications, it is understood to designate the Commissioners of the District of Columbia. Whenever the word "Engineer" is used, it is understood to designate the Engineer Commissioner of the District of Columbia, or, in his absence, his duly authorized assistants, assistant engineers, and inspectors representing him, limited by the special duties intrusted to them.

4. *Address.*—Post office address, county and State, of the bidder must be written or printed after the signature, and such address is the one, in the absence of written directions to the contrary, to which notice of the award of contract may be mailed or delivered, but the said notice may be served on the bidder or any agent of the bidder.

5. *Prices.*—All prices must be written in words as well as expressed in figures. In case of variation the written prices shall govern.

6. *Identification of proposal.*—Proposals will be placed in a sealed envelope, so marked as to indicate its contents without being opened. This envelope will be placed in another addressed to the Commissioners of the District of Columbia, Washington, D. C.; if forwarded otherwise than by mail it must be delivered to the secretary to the board of commissioners.

7. *Rejection of bids.*—Reasonable grounds for supposing that any bidder is interested in more than one proposal for the same item will cause the rejection of all proposals in which he is interested. The commissioners reserve the right to waive any informality in the proposals received, and to reject any or all proposals, or parts of a proposal, and to make the award in such manner as they consider best for the interests of the District of Columbia. Proposals received after the time advertised for opening bids will be returned unopened. No proposal will be accepted from any failing bidder or contractor known as such on the records of the District of Columbia for 20 years prior to the date of bid. No telegraphic proposal will be considered.

8. *Experience.*—Bidders must present satisfactory evidence that they have been regularly engaged in the business of constructing such work as they propose to execute, and in case the lowest responsible bidder has never done any

work for the District of Columbia, he must, prior to the award of contract, be able to show work done by him within a distance of 1,000 miles from the District of Columbia, and may be required to pay the necessary expenses of an inspection of such work by such representatives of the District of Columbia, not exceeding two in number, as may be sent by the Engineer to examine same.

9. *Capital and plant.*—Bidders must present satisfactory evidence that they are fully prepared with the necessary capital, materials, and machinery to conduct the work to be contracted for to the satisfaction of the commissioners and to begin it promptly when ordered.

10. *Guaranty deposit.*—Bidders will inclose a receipt of the collector of taxes of the District of Columbia for the amount named in the form of proposal as a guarantee of good faith, and as reasonable, fixed, and liquidated damages, and not as a penalty to the District of Columbia, and which they agree to forfeit in the event of their failure to enter into contract, with good and sufficient sureties, within 10 days after notification of acceptance of their proposal.

11. *Return of deposits.*—Bidder's deposits will be returned on application to the chief clerk, Engineer Department, to unsuccessful bidders after award of contract is made and to successful bidders after execution of contract.

12. *Changes.*—Changes, alterations, or interlineations must be explained by foot note in proposal.

13. *Withdrawal.*—If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the secretary to the board of commissioners, and when reached, it shall be handed to him or to his authorized agent unread.

GENERAL STIPULATIONS.

14. *Bond.*—Good and sufficient bond in a penal sum equal to 25 per cent of the estimated amount of the contract, with sureties or a surety company satisfactory to the commissioners, will be required from all contractors, guaranteeing that their contract will be faithfully performed; that the contractor or contractors will be responsible for all claims for damages to persons, property, or premises arising out of his or their operations prior to the acceptance of the finished work, and that he or they will promptly make payments to all persons supplying him or them with labor and materials in the prosecution of the work provided for in the contract. In the event that the sureties or surety company become unsatisfactory to the said commissioners, they may, in their discretion, require from the contractor an additional or new bond, in the same or a lesser penal sum, with sureties or a surety company satisfactory to them and to be conditioned as above required. Upon the failure to furnish such additional or new bond within 30 days after written notice so to do, all payments under this contract will be withheld until such additional or new bond is furnished.

15. *Transfers.*—No contract or any interest therein shall be transferred by the parties to whom the award is made; such transfers will be null and void, and will cause the contract to be annulled and the work to be given to other parties under the conditions mentioned herein.

16. *Patents.*—The District of Columbia assumes all responsibility under this specification and contract as to any claim which may be made that any process prescribed in these specifications is an infringement of any patent covering pavement construction and will defend and save harmless the contractor as to any such claim or the defense thereof in the courts: *Provided, however,* That the District of Columbia shall not be liable for claims for damages or anticipated profits preferred by the contractor on account of delay, interruption, or abandonment of the work occasioned by or resulting from such action of infringement as is above referred to. The contractor, however, will be required to hold the District of Columbia harmless against all or any claims for the use of any patented article, appliance, or process in connection with the contract herein contemplated except as related above.

17. *Contractor's risk.*—All loss or damage due to negligence, or arising out of the nature of the work to be done, or from any unforeseen or unusual obstruction or difficulties which may be encountered in the prosecution of the same or from the action of the elements will be sustained by the contractor.

18. *Employees.*—The contractor shall employ capable superintendents or foremen to represent him on the work, and they shall receive and obey orders from the engineer. He shall so conduct his operations as to interfere with the work of other District contractors as little as possible. The foreman, mechanics,

and others employed by the contractor shall be skilled in the several parts which are given them to do. An employee or agent of the contractor who shall use profane or abusive language to the inspector, or otherwise impede or embarrass him in the performance of his duty, or who, in the opinion of the engineer, is careless or incompetent, or obstructs the progress of the work, or disobeys or evades the instructions given by the engineer, shall be immediately discharged and not again employed without the consent of the engineer.

19. *Aid in procuring contract.*—The contractor expressly warrants that he has employed no third person to solicit this contract in his behalf, or to cause or procure the same to be obtained upon compensation in any way contingent, in whole or in part, upon such procurement; and that he has not paid, or promised or agreed to pay, to any third person, in consideration of such procurement, or in compensation for services in connection therewith, any brokerage, commission, or percentage upon the amount receivable by him hereunder; and that he has not, in estimating the contract price demanded by him, included any sum by reason of any such brokerage, commission, or percentage; and that all moneys payable to him hereunder are free from obligation to any other person for services rendered, or supposed to have been rendered, in the procurement of this contract. He further agrees that any break of this warranty shall constitute adequate cause for the annulment of this contract by the District of Columbia, and that the District of Columbia may retain to its own use from any sums due or to become due thereunder an amount equal to any brokerage, commission, or percentage so paid, or agreed to be paid.

20. *Act of September 1, 1916.*—The attention of bidders is invited to the following paragraph contained in the act entitled "An act making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June 30, 1917, and for other purposes," approved September 1, 1916: "Hereafter, where formal written contracts with bonds are required to be made by the District of Columbia for work, material, or supplies, good and sufficient bonds to the District of Columbia shall be required from the contractors in a penal sum not less than twenty-five per centum of the amount of the contract, with sureties or a surety company to be approved by the Commissioners of the District of Columbia guaranteeing that the terms of the contract shall be strictly and faithfully performed to the satisfaction of the Commissioners; that the contractors shall promptly make payments to all persons supplying them labor and materials in the prosecution of the work provided for in such contracts as now provided by law; and that such work shall be kept in repair as now provided by law for a period of one year from the date of completion of said work; but no cash retent to guarantee such repair shall be held or required on such contracts; and all laws and parts of laws contrary to the provisions hereof are hereby repealed: *Provided further*, That this provision shall also apply to contracts heretofore executed, either completed or in process of execution."

21. *Claims and limitation of hours.*—Attention is also invited to Public Act No. 82, approved February 28, 1899, relative to payment of claims for material and labor furnished for District of Columbia buildings, and to the Public Act relating to the limitation of the hours of daily service of laborers and mechanics upon the public works of the United States and the District of Columbia.

22. *Protection of life and property.*—All laws and regulations of the United States and of the District of Columbia, especially in so far as they relate to the protection of life and property, are to be strictly observed.

23. *Eight-hour law.*—The following provision made in accordance with Public Act of Congress, No. 199, approved June 19, 1912, is made a part of this contract:

(*a*) "No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day upon such work under a penalty for each violation of this provision of $5 for each laborer or mechanic for every calendar day in which he shall be required or permitted to labor more than eight hours upon said work."

(*b*) "It shall be the duty of the inspector or inspectors, or other employees of the District of Columbia, upon observation or investigation, forthwith to make report to the Commissioners of the District of Columbia of all violations of the provisions of this paragraph and of said act, together with the name of each laborer or mechanic who has been required or permitted to labor in violation of the provisions hereof, the day or days of such violation, and the amount of

penalties accruing under the provisions hereof by reason of such violation. This sum shall be withheld for the use and benefit of the District of Columbia by the auditor of the District of Columbia out of any money due the contractor, whether the violation is by the contractor or any subcontractor. Any contractor or subcontractor aggrieved by the withholding of any penalty as hereinbefore provided shall have the right within six months thereafter to appeal to the Commissioners of the District of Columbia, who shall have the power to review the action imposing the penalty; and in all such appeals from such final order whereby a contractor or subcontractor may be aggrieved by the imposition of the penalty hereinbefore provided, such contractor or subcontractor may, within six months after the decision of said commissioners, file a claim in the Court of Claims, which shall have jurisdiction to hear and decide the matter in like manner as in other cases before said court."

(*c*) Nothing in this provision shall be construed to repeal or modify the act of Congress relating to the limitation of the hours of daily service of laborers and mechanics employed upon the public works of the United States or the District of Columbia approved August 1, 1892, as modified by acts of Congress approved February 27, 1906, and June 30, 1906, and March 3, 1913."

24. *Weather.*—The contractor shall suspend all work under the contract when notified by the engineer that the weather is unsuitable for carrying it on. If the work is allowed during cold or freezing weather, the contractor shall take such additional precautions as the engineer shall require, without additional charge, and under no circumstances shall materials be used which have been injured by the weather.

25. *Sundays or legal national holidays.*—No work shall be done on Sundays or legal national holidays, except in cases of emergency, and then only with the consent of the engineer; nor shall any work be done at night unless authorized in writing by the engineer.

26. *Extra work.*—The contractor must be prepared to do any extra work ordered in writing by the engineer (commissioner) that may appear necessary, and for this he will be paid at current rates for work of similar character; or, if the extra work should be of a class for which rate is not fixed by current contracts, the actual reasonable cost to the contractor, as determined by the engineer (commissioner), plus 15 per cent. The contractor shall have no claim for compensation for extra work unless the same is ordered in writing by the Engineer commissioner. All extra work shall conform to current District of Columbia specifications therefor.

27. *Modification.*—The commissioners reserve the right to modify these specifications as may from time to time seem desirable. The amount of compensation, if any, due to the contractor for such modification will be determined by the engineer (commissioner) on the same basis as in the case of extra work.

28. *Inspection.*—Inspectors may be appointed who shall have access to all parts of the work at all times, and whose duty it shall be to point out to the contractor any neglect or disregard of the specifications of the contract; but the right of final rejection of the work will not be waived at any time. Upon all technical questions concerning the execution of the work in accordance with the specifications and the measurements thereof the decision of the engineer shall be final. Ordinarily one inspector will be employed by the District of Columbia for each section of the work under contract; but if, on account of any apparent disregard of the specifications or of unnecessary delay in prosecuting the work, additional inspectors shall be required, they will be employed by the District of Columbia, at the rate of not to exceed $4.50 per diem each, and the cost of the same will be charged to the contractor and deducted from any moneys due or that may become due to the contractor.

29. *Condemned work.*—All materials furnished and work done not in accordance with these specifications shall be removed within 24 hours after written notice from the engineer, by and at the expense of the contractor; or, in case of failure to do so, it shall be removed by the District of Columbia and the cost thereof charged to the contractor and deducted from the amount due or which may become due him. None but the best material of the several descriptions shall be used.

30. *District material.*—No materials furnished by the District shall be applied to any other use, public or private, than that for which they are issued to the contractor. The contractor will be held responsible for all materials delivered to him upon requisition, and shall be charged for all materials delivered upon said requisition. Should the amount of materials actually delivered and not properly acounted for exceed the amount used upon the work, the cost to the

District of the difference must be made good by the contractor, and will be deducted from any moneys which may be due him. Any material that is the property of the District that is not accounted for by the contractor to the satisfaction of the Engineer will be charged against the contractor at the contract price for similar material.

31. *Breach.*—No waiver of any breach of the contract shall constitute a waiver of any subsequent breach of any part thereof, nor of the contract.

32. *Failure.*—If the contractor shall delay or fail to commence with the delivery of the material or the performance of the work as specified herein, or shall, in the judgment of the Commissioners of the District of Columbia, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the said commissioners shall have the power to annul this contract by giving notice in writing to that effect to the contractor, and upon the giving of such notice all payments to the contractor under this contract shall cease, and all money or reserved percentage due or to become due thereunder shall be retained by the said commissioners until the final completion and acceptance of the work herein stipulated to be done; and the said commissioners shall have the right to recover from the contractor whatever sums may be expended by the District of Columbia in completing the said contract in excess of the price herein stipulated to be paid the contractor for completing the same, and also all costs of inspection and superintendence, including all necessary traveling expenses connected therewith, incurred by the said District of Columbia, in excess of those payable by the said District of Columbia during the period herein allowed for the completion of the contract by the contractor, and the said commissioners may deduct all the above-mentioned sums out of or from the money or reserved percentage retained as aforesaid; and upon the giving of the said notice the said commissioners shall be authorized to proceed to secure the performance of the work or delivery of the materials, by contract or otherwise, in accordance with law.

33. *Payments.*—Payments will be made monthly, *provided the progress of the work is satisfactory*, less 10 per cent of each estimate, to be withheld until final payment.

34. *Conveniences.*—The contractor shall furnish for use of his force on the work, necessary toilet conveniences, secluded from public observation.

35. *Cleaning up.*—On the completion of work it shall be thoroughly cleaned up before it will be accepted.

36. *Lines.*—All necessary lines and levels will be given by the Engineer by means of suitable marks, and in establishing them the contractor shall provide such materials and assistance as may be required by the Engineer. All marks given are to be carefully preserved and if destroyed through carelessness the cost of replacing them shall be charged against the contractor at a fixed price of $2 for each point, to be deducted from any money found due at final settlement.

WORK TO BE DONE.

37. *Work.*—The work to be done under this proposal and contract will consist of paving with sheet asphalt the streets, avenues, and roads named in paragraph 38, or parts thereof, or doing any portion of such work, as may be ordered in writing by the Commissioners of the District of Columbia.

38. *Amounts.*—The streets and avenues expected to be so improved and the approximate quantities of work of each are as follows: (On file in office of Engineer Commissioner, District of Columbia.)

The order of work on the streets, roads, and avenues named will be as directed by the engineer commissioner.

The work must be so conducted that the entire work will be completed before July 1, 1921, unless otherwise authorized by the engineer commissioner. Attention is called to the limitation on the working season contained in paragraph 51.

Bids will be scheduled on the basis of the prices named for pavements with a 6-inch concrete base, but the prices named for a 5-inch base will be incorporated in the contract and such work as may be so directed will be executed and paid for as such.

39. *Bids.*—The contractor will, for the prices bid, do all the work prescribed in these specifications; do all the necessary grading and trimming of the roadbed and all rolling; provide bridges, fences, and other means of maintaining travel on intersecting streets, roads, and railroads, and all private driveways af-

ter giving due notice to parties affected thereby; maintain the same in good and safe condition as long as may be necessary, and then remove such temporary expedients and restore such roads to their proper condition; provide watchmen, lights, fences, and other precautionary measures necessary to the protection of person and property; furnish all materials (except as specified) and all tools and implements, labor, and transportation required to lay and put in complete order for use the specified pavement, and do each and all of these to the satisfaction of the engineer. Upon the completion of the work he will remove any temporary structures erected during the progress of the work, and restore all fixtures, pavements, and parkings, both public and private, to satisfactory condition.

40. *Old material.*—Old material removed from the street will be the property of the District of Columbia and the work of removal will be paid for at prices named in paragraph 70 of these specifications. Granite blocks, cobble, old curb, etc., must be removed to the nearest property yard or to such other places as the engineer may direct. On Connecticut Avenue and on Nicholson Avenue the District reserves the right to salvage and remove the broken stone in the prism to be graded by scarifying with a steam roller and forking out the stone by the use of its own forces.

To compensate the contractor for the reduction in the quantity of grading per square yard of street and for the loss of the fraction of the cost of trimming and rolling the subgrade which is specified as included in the cubic yard price of grading, an additional allowance of 7 cents per square yard for the purpose of this paragraph will be paid on such portions of the above-named streets as may be treated by the District forces in the above manner.

41. *Grading and subgrade.*—Lines and grades will be established by the engineer, and no work will be commenced until these are given. The area over which the pavement is to be laid must be excavated to the proper depth below the surface of the pavement when completed, any objectionable or unsuitable matter below the bed being removed to such depth as may be directed by the engineer and the space filled with suitable material thoroughly compacted. The bed, after being trimmed so as to be parallel to the surface of the pavement when completed, will be thoroughly compacted by rolling with a roller weighing not less than 5 tons, by heavy ramming at places which can not be reached by the roller; dampening the bed before rolling and ramming, if required, to the satisfaction of the engineer. No extra allowance will be made for trimming or rolling, but the volume of earth, etc., removed will be paid for as grading of its class. Any filling will be done in layers not exceeding 12 inches in thickness, and all materials used for this purpose will be subject to approval. If improper or unsuitable material be used, it will be removed at the cost of the contractor. All measurements will be made in place, and payments made thereon. Should the grading involve work in both "cut" and "fill," the measurement of it will be computed on the basis of the volume of the material in place in the "cut" only; the excavated material from the "cut" section deposited in the "fill" will not be again paid for as "fill." Should the amount of cut on the street not suffice to make the necessary fill, the amount borrowed from other designated localities will be paid for as grading.

42. *Concrete base.*—Upon the bed thus prepared there will be laid a 6-inch foundation of concrete proportioned one bag (one-quarter of a barrel) of the specified cement, 3 cubic feet of specified sand, and 7 cubic feet of specified gravel.

43. *Cement.*—Cement used shall be tested by the District of Columbia prior to use in accordance with the United States Government specifications for portland cement, Circular 33, of the Bureau of Standards. The contractor may keep the cement in storage under proper protection until it is used but after being accepted by the District of Columbia it can not be transferred or used by the contractor on other work without the consent of the engineer commissioner. No cement shall be used which in the opinion of the engineer has been injured by age or exposure. If cement is furnished by the contractor that has been 28-day tested and accepted by the Bureau of Standards at the mill and is identified as such it will be subjected only to a one-day retest by the District of Columbia.

44. *Sand.*—The sand used shall be equal to what is known locally as best well graded Potomac River concrete sand. It shall be clean and free from injurious soft particles or organic matter.

45. *Gravel.*—The gravel shall be equal to what is known locally as best well graded Potomac River 1¼-inch washed gravel. It shall be clean and free from objectionable matter.

Measurement of aggregate.—Sand and gravel for concrete or mortar shall
refully measured. The quantities for each batch shall be exactly sufficient
used with either one or more whole sacks of cement, and not fractional
In proportions for concrete mixtures herein mentioned, aggregate is
fied in terms of cubic feet per bag of cement. If wheelbarrows are used
andling aggregate all those on any one job shall be of the same style and
ity. The capacity shall be checked by the District inspector. For this
se there shall be used a wooden box, the property of the District of Colum-
e inside dimensions of the base of which shall be exactly 1 foot square,
e accurately graduated height of which shall be such as to meet require-
The contractor shall furnish and keep on hand for such occasional use
y be necessary wooden templates of such shape that when resting on the
f the barrow and drawn over its load the template shall strike off the
ts of the required amount as determined by the use of the above men-
box.

Storing aggregates.—Sand and gravel shall be kept clean. Delivery on the
de will not be permitted prior to rolling. When aggregates are deposited
on the subgrade care shall be taken when shoveling the aggregates for
it no clay or earth is taken.

Concrete mixed by hand.—If under exceptional circumstances and ap-
by the engineer the mixing be by hand, it shall be done on a water-tight
m with tight raised edges. The coarse aggregate shall be spread over
rtar which has been previously mixed. The aggregate shall be thoroughly
ed with water just before it is added to the mortar. The drenching shall
done in the barrow, nor otherwise to permit the addition of free water to
rtar. Each batch of concrete shall be thoroughly mixed until each piece
egate is wholly coated with mortar and in a manner satisfactory to the
r.

Concrete mixed by machine.—A batch mixed of approved type shall be
l it shall be equipped with a device for measuring water and another
mechanically preventing emptying of the mix until all the materials have
ixed a minimum time of 1 minute. During this period the drum shall
ot less than 12 nor more than 18 revolutions per minute. The entire con-
hall be removed from the drum before materials are placed therein for
eeding batch.

Water.—The amount of water used in mixing shall be the minimum which
oduce a workable concrete suitable for the purpose specified. Water
all be clean and free from oil, acid, alkali, or vegetable matter.

Placing concrete.—The subgrade will be moist when the concrete is de-
thereon and it will be deposited so as to obtain a continuous monolithic
oroughly compacted. Any evidence of lack of compaction will be re-
as sufficient reason for removal and replacement of the base. If con-
brought to the site of the work ready mixed it must be dumped on a
etal or other like surface and shoveled thence to its position on the sub-
Hauling over the base in less than four days will not be allowed unless
are laid. No concrete shall be laid between December 1 and March 15,
permission of the engineering commissioner.

ontractor shall not enter upon a concrete base in order to lay the binder
until it has obtained sufficient strength for such a purpose, and during the
between laying the base and binder he shall properly protect it, and
rdered by the engineer, shall sprinkle it in warm weather between the
f sunrise and sunset as often as may be deemed necessary, and in cold
cover it with a material suitable for its protection.

Retempering.—Retempering of mortar or concrete which has partially
d, that is, the mixing of this mortar or concrete with additonal ma-
or water, shall be prohibited.

Five-inch concrete base.—All provisions of the specifications for a 6-
ncrete base shall apply to a 5-inch concrete base which shall differ from
ch base only in respect to the thickness thereof and the price paid
r.

SHEET ASPHALT PAVEMENT.

Asphalt binder.—The binder course shall be composed of broken stone, of
d durable quality, its largest dimension passing an inch-and-a-quarter
and the stone, after passing the heating drums, shall not contain less
nor more than 15 per cent of material passing a No. 10 screen.

The stone will be heated not higher than 350° F., in suitable appliances. It is then to be thoroughly mixed by machinery with asphalt cement, such as is acceptable for surface cement, penetration 50 to 80, at such temperature and in such proportions that the resulting binder will have life and gloss without an excess of cement. Should it appear dull from overheating or lack of cement, it will be rejected. While hot is will be hauled upon the work, spread upon the base, and immediately rammed and rolled until it is cold. Should the resulting course not show a proper bond, it must be immediately removed and replaced by and at the expense of the contractor. Binder and top shall not be laid or taken from the yard to the site of the work when in the judgment of the engineer, weather conditions are unsuitable for the work of laying the pavement.

55. *Asphalt wearing surface.*—The wearing surface of the pavement shall be composed of—

Asphalt cement (refined asphalt and asphaltic flux).

Clean, sharp-grained sand.

Fine absorbent mineral dust.

56. *Asphalt.*—The asphalt shall be refined until homogeneous and free from water and shall not at any time be heated to a temperature high enough to injure it, and 100 parts of the refined product shall require not more than 30 parts of flux to produce the asphalt cement described in paragraph 58.

The asphalt for class (*a*) work shall conform to such tests as will establish its identity as a product of the refinement of a natural crude asphalt without the admixture of any other material.

The refined asphalt for class (*b*) work shall be the product of refinement of an unadulterated natural asphaltic oil, and shall contain after refinement not less than 90 per cent of bitumen soluble in carbon bisulphide.

57. *Asphaltic flux.*—The flux used in the manufacture of asphalt cement shall be an asphalt oil from which the lighter oils have been removed by distillation without cracking until the flux has the following characteristics:

Free from water and foreign matter.

Flash point not less than 300° F.

Distillate at 400° for 18 hours, less than 10 per cent.

The flash point shall be taken in a New York State closed oil tester.

The distillate shall be made with about 50 grams of flux in a small glass retort, provided with a thermometer and placed in a copper holder. The residue in the retort, after distilling, must be free from coke.

Any other softening agents approved by the engineer commissioner may be used in place of asphaltic flux.

58. *Asphalt cement.*—The asphalt cement must be of refined asphalt, fluxed when necessary with asphaltic oil, refined maltha, or other approved flux. The cement must be practically free from water and must be within the range of 40 to 70 penetration when tested at 77° F. on Dow penetration machine with No. 2 needle, 100 grams, 5 seconds. The degree of penetration to be fixed by the engineer commissioner.

Preference will be given to an asphalt cement that is not readily affected by water, provided it is satisfactory in other respects. The use of an asphalt under these specifications shall be subject to the approval of the engineer commissioner, and if an asphalt has been proposed for use by the contractor and approved by the engineer commissioner, no change in the asphalt to be used shall be made unless with the approval of the engineer commissioner. If an asphalt or flux is submitted for use which has not been successfully used for a period of at least two years for paving under conditions similar to those existing in the District of Columbia, its use may be limited to such extent as may be deemed advisable, or it may be rejected for use entirely in the discretion of the engineer commissioner.

The asphalt cement must comply with the following tests:

1. It must be of such consistency that when tested at 32° F. it will not show a hardness below 10 penetration, and when tested at 115° F. it will not be softer than 350 penetration.

2. When a briquette of the cement having a minimum cross section of 1 square centimeter, having a penetration of 50°–53° at 77° F. is tested for ductility at 77° F., the bitumen must stretch at the rate of 5 centimeters per minute to a distance of 25 centimeters before breaking.

3. When the cement is heated in an open tin box ⅜ inch deep by 2½ inches in diameter at a temperature of 300° F., for 7 hours in a hot-air oven, it must not show a loss by volatilization of over 5 per cent, and it must not have been hardened over 30 per cent by this heating.

The asphalt cement must never be heated to a temperature that will injure it.

When the asphalt cement contains over 5 per cent of material that will separate by subsidence while in a molten condition it must be thoroughly agitated before drawing from storage and while in use in the supply kettles so as to insure a uniform cement.

These properties shall be determined by tests made by uniform methods, as adopted in the office of the engineer commissioner.

59. *Sand.*—The sand to be used shall be free from mud, hard grained, and moderately sharp. On sifting it should have at least 15 per cent of material that would be caught on a 40 mesh per inch screen, 25 per cent of material that will pass an 80 mesh to the inch screen, and 10 per cent at least must pass a 100 mesh to the inch screen. If the sand to be used does not contain the desired fine material, mineral dust may be added to make up the deficiency, and in any case at least 5 per cent of such mineral dust shall be used. The amount of fine material may be increased at the discretion of the engineer commissioner.

60. *Mineral dust.*—This shall be any fine Portland cement or limestone dust, the whole of which shall pass a 30-mesh screen, and at least 85 per cent pass a 100-mesh screen.

61. *Asphalt paving material.*—The materials complying with the above specification shall be mixed in proportion by weight, depending upon their character and the traffic on the street and upon the character of the asphalt, and will be determined by the engineer commissioner, but the percentage of bitumen in any mixture soluble in carbon bisulphide shall not be less than 9 nor more than 13 per cent. If the proportions of the mixture are varied in any manner from those specified the mixture will be condemned; its use will not be permitted; and if already placed on the streets, it must be removed and replaced by proper materials at the expense of the contractor.

The sand or the mixture of sand and stone dust and the asphalt cement will be heated separately to about 300° F. The dust, if limestone, will be mixed while cold with the hot sand in the required proportions and then mixed with the asphalt cement at the required temperature and in the proper proportion in a suitable apparatus, so as to effect a thoroughly homogeneous mixture. Sand boxes and asphalt gauges will be weighed in the presence of inspectors as often as may be desired.

Samples of all material entering into the composition of the pavement shall be supplied to the inspector of asphalt and cements when required, in suitable tin boxes and cans; he shall have access to all branches of the works at any time, and shall have the right to obtain samples of all materials from the source of supply.

62. *Laying asphalt surface.*—The asphalt paving mixture, prepared in the manner described, will be hauled to the site of the work at a temperature of not less than 250° or more than 350° F. in trucks or wagons, canvas covers being provided for use in transit. It will then be shoveled into place and thoroughly spread to a thickness of at least 2½ inches by means of hot iron rakes, in such manner as to give uniform and regular grade, so that, after having received its ultimate compression, it will have a net thickness of at least 1½ inches. This thickness will be constantly tested by means of gauges furnished by the engineer commissioner. The surface will then be compressed by steam rollers—first with a roller weighing not less than 2½ or more than 5 tons—after which a small amount of hydraulic cement will be swept over it, and will then be thoroughly compressed by a steam roller weighing not less than 10 tons, the rolling being continued for not less than five hours for every 1,000 yards of surface. The street to be barricaded, the barricades to remain for such length of time as deemed necessary by the engineer commissioner. Binder or topping shall not be laid when in the judgment of the engineer weather conditions are unsuitable for the work of laying the pavement. The surfaces on which they are laid must be cleaned to the satisfaction of the engineer, so that good adhesion of the binder to the base and of top mixture to the binder may be secured.

63. *Laying vitrified blocks.*—Vitrified-block gutters will ordinarily be 13½ inches wide, laid on a concrete base 6 inches in depth, of the same material and proportions and laid in the same manner as prescribed in these specifications for the concrete base under asphalt pavements.

As soon as practicable after the concrete base has been laid, a dry mixture, composed of 4 parts of the sand specified in paragraph 44, and 1 part of Portland cement, thoroughly mixed, will be spread thereon to the depth of not

less than one-half inch, as a bed for the paving blocks, and regulated so as to be exactly parallel to the finished grade of the gutter.

On the bed thus prepared for them the blocks will be set on edge, with the longest dimensions at right angles to the curb, or as directed by the engineer.

The longitudinal joints of each course of blocks laid must be broken by a lap of not less than 4 inches.

The blocks will then be carefully rammed by placing a plank over several courses and ramming the plank with a heavy rammer. The ramming will be continued until the blocks reach a firm, unyielding bed and present a uniform surface, with proper grade. Any lack of uniformity in the surface or defect in the grade must be corrected by taking up and relaying the blocks.

After proper ramming the entire gutter will be sprinkled with water and thoroughly grouted with a thin, easily flowing grout of neat Portland cement.

A similar construction of block to that described for the gutters may be used adjacent to railroad tracks; the base will in that case extend to the bottom of the cross-ties, or at least 6 inches thick.

The blocks will be furnished the contractor at the District property yards and must be hauled to the work at his expense.

64. *Additional work.*—The following specifications will cover incidental work which may be required of the contractor:

65. *Setting 6 by 20 inch granite and bluestone curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 24 inches below the top of the curb when set, and 20 inches wide, will be excavated to receive the curb and its gravel bed; the dimensions of the trench, in width, will be 14 inches from the curb line toward the building line of the street, and 6 inches from said curb line toward the center line of the street. In the trench thus prepared the curb will be set, and brought to line and grade, with plumb face. Spalls of stone, hard burned brick or other acceptable substance, prepared for the purpose, will be used to adjust the curb to grade, and these spalls will be so placed and adjusted as to support the curbing permanently, and afford a firm and stable support for it without the use of small chips and fragments, used as "shimming" pieces, to wedge the stone in place. After the curb has been properly placed and adjusted to line and grade, the trench will be filled with gravel of approved quality to within 8 inches of the top of the curb, the filling to be done in layers of not more than 3 inches in depth, and thoroughly compacted by suitable ramming. Close contact joints and even surfaces must be made, and the lines and grades furnished strictly followed.

66. *Setting 8 by 8 inch granite curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 15 inches below the top of the curb when set, and 18 inches wide, will be excavated to receive the concrete and the curb. The dimensions of the trench in width will be 14 inches from the curb line toward the building and 4 inches from the curb line toward the center line of the street. In the trench thus prepared a bed of concrete, composed of 1 part of Portland cement, 3 parts of clean concrete sand, and 7 parts of screened pebbles, will be laid, filling the trench to a depth of 5 inches, the material to be mixed and laid under the same conditions as prescribed for laying cement concrete base for sheet asphalt pavements. On the base prepared and laid as above, the curb will be placed before the concrete has set, and adjusted to line and grade by setting it to a firm, unyielding bearing in a bed of freshly made concrete, by the use of heavy wooden mauls. The face of the curb must be plumb and true to line, and the top of it carefully set to grade with close and even contact joints. After the curb has been set to line and grade, the trench on the footwalk side will be immediately filled with concrete to within 5 inches of the top of the curb, which will be thoroughly rammed and compacted, after which it will immediately be covered with earth to prevent injury to it through too rapid evaporation, etc. In case vitrified-block gutters are to be laid in front of the curb, any portion of the concrete base of the curb that would interfere with the laying of such gutters must be removed immediately after the curb is set.

67. *Resetting 6 by 20 inch granite and bluestone curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except no hauling of the curb is required other than that incidental to the necessary disposition of it upon the line of the work. Under this classification also, the curb may be adjusted to line and grade without removing it from its trench, if so ordered by the engineer.

68. *Resetting 8 by 8 inch granite curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except that no hauling of the curb is required other than that incidental to the necessary disposition of it upon the line of the work, and no new concrete is required other than that sufficient to imbed the stone and back and adjust it to line and grade.

69. *General instructions.*—All curb will be furnished to the contractor at the District property yard, and will be hauled by him to the site of the work; and curbing unaccounted for, or improperly disposed of, or damaged, or broken, through careless or unskilled handling, will be charged against him, and the value of the loss to the District will be deducted from any amount due the contractor for work done, as determined by the engineer.

All expenses connected with or incidental to the work of setting or resetting curb, as described above, including the hauling of the curbing, preparing the curb trenches, and the necessary grading connected therewith, furnishing gravel and spalls, furnishing and placing concrete, and all other material and labor necessary to execute the work in accordance with the specifications therefor, are included in the fixed price for the respective items as hereinafter stated. The cost of dressing, jointing, or cutting the curb will be paid for additionally, but no other claim for additional compensation will be entertained.

Should the adjoining brick footwalks be disturbed in order to set or reset the curb, the portion so disturbed shall be repaved, if required by the engineer, without cost to the District.

70. *Prices for additional work.*—Contractors must do such additional work incident to the construction of new pavements as may be ordered on each street by the engineer commissioner. All such work shall be in accordance with current District specifications. Prices paid for this work will be as stated below:

1. Removing old curb, including haul not to exceed 2 miles, 20 cents per linear foot.
2. Hauling same beyond distance of 2 miles, 1½ cents per linear foot per mile.
3. Hauling from District property yard and setting 6 by 20 inch curb, 90 cents per linear foot.
4. Resetting 6 by 20 inch granite and bluestone curb, 50 cents per linear foot.
5. Hauling from District property yard and setting 8 by 8 inch curb, 70 cents per linear foot.
6. Resetting 8 by 8 inch curb on new concrete base, 50 cents per linear foot.
7. Resetting 8 by 8 inch curb on old concrete base, 40 cents per linear foot.
8. Dressing, jointing, and cutting curb, etc. (stonecutter's time), including setting-up labor, $1.75 per hour.
9. Removing old rubble, cobble, flagging stone and brick, vitrified block or brick, etc., including haul not to exceed 2 miles, 30 cents per square yard.
10. Removing old asphalt blocks, including haul not to exceed 2 miles, 32 cents per square yard.
11. Removing old granite block, including haul not to exceed 2 miles, and removal of old paving bed and cleaning concrete base where same exists, 50 cents per square yard.
12. Overhaul on items 9, 10, and 11, 2½ cents per square yard per quarter mile or fraction thereof.
13. Removing old coal-tar or asphalt surface and binder from concrete base in connection with resurfacing work, including haul not to exceed 2 miles, 25 cents per square yard.
14. Grading and hauling earth, not to exceed 1,000 feet, $1.50 per cubic yard.
15. Grading and hauling macadam not to exceed 1,000 feet, $1.50 per cubic yard.
16. Removing old coal-tar and bituminous pavements or base of the class laid since 1880 and hauling not to exceed 1,000 feet, $2 per cubic yard.
17. Removing old coal-tar and bituminous pavement or base of the class laid prior to 1880 and hauling same not to exceed 1,000 feet, $3.20 per cubic yard.
18. Removing old concrete base and hauling not to exceed 1,000 feet, $2.75 per cubic yard.
19. Hauling excavated material per 100 feet over first 1,000 feet, 1½ cents per cubic yard.

20. Laying or relaying vitrified brick or block on old concrete base, $3 per square yard.
21. Laying or relaying asphalt block and vitrified brick or block on gravel base, $1 per square yard.
22. Cleaning old vitrified brick or block for relaying, 50 cents per square yard.
23. Laying and relaying granite block, $1.10 per square yard.
24. Relaying cobble and rubble, 60 cents per square yard.
25. Repairing cement walks, including haul, $2.75 per square yard.
26. Repairing brick walks, 40 cents per square yard.
27. Laying Portland cement concrete base in place, $9 per cubic yard.
28. Adjusting manhole tops and basin covers to grade, $2.50 each.
29. Adjusting water-valve casings to grade, $5 each.
30. Asphaltic top, 75 cents per cubic foot.
31. Asphaltic binder, 43 cents per cubic foot.
32. Adjusting electric-light or telephone manhole tops to grade, as follows:
(*a.*) Size, less than 6 square feet area, $2.50 each.
(*b.*) Size, over 6 and less than 16 square feet, $5 each.
(*c.*) Size from 16 to 28 square feet, $9 each.
Customarily the additional work amounts to about 20 per cent of the total cost of a street.
33. Additional allowance for trimming and rolling under conditions stated in paragraph 40, 7 cents per square yard.

71. *Guaranty.*—All work under this contract will be guaranteed and kept in repair by the contractor without cost to the District of Columbia for a period of one year from date of its completion as indicated on the final voucher for each street.

On expiration of guaranty for maintenance the work is to be inspected, and all imperfections must be corrected where and to such extent as the engineer shall direct, upon which the engineer will accept the same in writing, and until such acceptance the guaranty shall be in force. Repairs that may become necessary during the guaranty period will be made by the contractor when ordered by the engineer commissioner.

If the contractor fails to make such necessary repairs after notice to do so the commissioners may cause such work to be done and the contractor and the surety or sureties under the bond shall be jointly and severally liable for the cost of same.

72. *Cuts.*—Contractors shall be responsible for any work done upon any street over plumbers' cuts or other work done by the permission of the commissioners before the work is begun.

CONCRETE ROADWAYS.

(Materials for concrete and mortar.)

73. *Cement.*—Cement used shall be tested by the District of Columbia prior to use in accordance with the United States Government specifications for Portland cement, circular 33, of the Bureau of Standards. The contractor may keep the cement in storage under proper protection until it is used, but after being accepted by the District of Columbia it can not be transferred or used by the contractor on other work without the consent of the engineer commissioner. No cement shall be used which in the opinion of the engineer has been injured by age or exposure. If cement is furnished by the contractor that has been 28-day tested and accepted by the Bureau of Standards at the mill and is identified as such, it will be subjected only to a one-day retest by the District of Columbia.

74. *Sand.*—The sand used shall be equal to what is known locally as best well-graded Potomac River concrete sand. It shall be clean and free from injurious soft particles or organic matter.

75. *Gravel.*—The gravel shall be equal to what is known locally as best well-graded Potomac River 1½-inch washed gravel. It shall be clean and free from objectionable matter.

76. *Sand screens.*—Sand used for mortar and dry coat must be screened on the line of work; screens to be used for this purpose to be designated by the engineer.

77. *Measurement of aggregate.*—Sand and gravel for concrete or mortar shall be carefully measured. The quantities for each batch shall be exactly sufficient to be used with either one, two, or three sacks of cement, and not fractional

sacks. In proportion for concrete mixtures herein mentioned aggregate is specified in terms of cubic feet per bag of cement. If wheelbarrows are used for handling aggregate all those on any one job shall be of the same style and capacity. The capacity shall be checked by the District inspector. For this purpose there shall be used a wooden box, the property of the District of Columbia, the inside dimensions of the base of which shall be exactly 1 foot square, and the accurately graduated height of which shall be such as to meet requirements. The contractor shall furnish and keep on hand for such occasional use as may be necessary wooden templates of such shape that when resting on the sides of the barrow and drawn over its load the template shall strike off the contents to the required amount as determined by the use of the above-mentioned box.

78. *Water.*—Water used shall be clean and free from oil, acid, alkali, or vegetable matter. The amount of water used in mixing shall be the minimum quantity that will produce a workable concrete suitable for the purpose specified. The amount of water will be tested as follows: A small amount of freshly mixed concrete will be well tamped in a metallic form the shape of a frustum of a cone, the base of which shall be 8 inches in diameter, the top 4 inches in diameter, and the height 12 inches. As soon as the molding is completed, the former will be lifted from the sample. The resulting slump shall not exceed 1½ inches. The metallic form used for the purpose shall be the property of the District of Columbia and be maintained on the job in the possession of the District of Columbia inspector.

79. *Storing aggregates.*—Sand and gravel shall be kept clean. Delivery on the subgrade will not be permitted prior to rolling, as stipulated in paragraph 55. When aggregates are deposited directly on the subgrade, care shall be taken when shoveling the aggregates for use that no clay or earth is taken.

MORTAR AND CONCRETE.

80. *Mortar.*—Mortar shall be composed of cement and sand in proportions specified. The mixtures are intended to secure a mortar in which every particle of sand is enveloped by cement, and this result must be obtained to the satisfaction of the engineer. If the mixing be by hand, it shall be done on a water-tight platform with tight raised edges. Mixing may be done by the use of an approved machine. No batch shall contain more than one barrel of cement.

81. *Concrete mixed by hand.*—If under exceptional circumstances and approved by the engineer, the mixing be by hand, it shall be done on a water-tight platform with tight raised edges. The aggregate shall be spread over the mortar made as above directed. The aggregate shall be thoroughly drenched with water just before it is added to the mortar. The drenching shall not be done in the barrow, nor otherwise to permit the addition of free water to the mortar. Each batch of concrete shall be thoroughly mixed until each piece of aggregate is wholly coated with mortar and in a manner satisfactory to the engineer.

82. *Concrete mixed by machine.*—A batch mixer of approved type shall be used and it shall be equipped with a device for measuring water and another one for mechanically preventing emptying of the mix until all the materials have been mixed a minimum time of one minute. During this period the drum shall make not less than 12 nor more than 18 revolutions per minute. The entire contents shall be removed from the drum before materials are placed therein for the succeeding batch.

83. *Retempering.*—Retempering of mortar or concrete which has partially hardened—that is, the mixing of this mortar or concrete with additional materials or water—shall be prohibited.

84. *Damaging weather.*—Concrete shall not be mixed or placed when the temperature is below 35° F. In freezing weather the surface must be protected from frost at least 10 days from the time of laying. Green concrete must be protected from rain and the wash of storm water. If the pavement becomes appreciably damaged by frost or water it shall be replaced at the contractor's expense on written notice from the engineer.

CONCRETE ROADWAY OR ALLEY.

85. *Composition.*—The concrete roadway or alley pavement shall be composed of concrete proportioned 1 bag of specified cement, 2¼ cubic feet of specified sand, and 3¾ cubic feet of specified gravel.

86. *Laying concrete.*— The concrete shall be laid upon a prepared moist subgrade to a thickness of 6 inches in successive batches continuously between transverse joints for the full width of the road.

87. *Transverse joints.*—Contraction or expansion joints, except as provided for in paragraph 62, will not be required.

88. *Joints at the close of day's work.*—At the close of each day's work and also when the process of depositing concrete is stopped for a length of time such that in the opinion of the engineer the concrete will take its initial set, a butt construction joint shall be made perpendicular to the center line of the pavement. For this joint there shall be used a clean plank having a thickness of not less than 1½ inches. Upon the resumption of work the plank shall be carefully removed and the fresh concrete deposited against the old in such manner as to avoid injury to the edge of the old concrete.

89. *Screening.*—The surface of the concrete shall be struck off by means of templates moved with a crosswise motion. The concrete having been brought to the surface grade, men will not be permited to stand on boards placed therein in order to carry on the work.

90. *Rolling.*—Immediately after the concrete has been struck off it shall be rolled with an approved metal hand roller having a smooth, even surface approximately 6 feet in length, not less than 8 inches or more than 12 inches in diameter. An 8-inch roller shall weigh not more than 12 pounds per linear foot and a 12-inch roller not more than 15 pounds per linear foot. The roller shall be moved very slowly over the surface of the concrete with a crosswise motion so as to advance the roller longitudinally not to exceed 2 feet in passing from one side of the pavement to the other. The rolling shall be continued until free water ceases to come to the surface, but all portions of the concrete surface shall receive at least three rollings.

91. *Finishing.*—After rolling has been completed the concrete shall be finished by dragging the surface in a longitudinal direction with a rubber hose not less than 1½ inches in diameter, the hose extending across the pavement from curb to curb.

92. *Protection of concrete.*—On the next day after the pavement has been laid and thereafter for a total of five days, the surface shall be sprinkled with water so that it shall be continuously wet between the hours of 7 a. m. and 6 p. m. Traffic shall be excluded from the pavement for 18 days by the erection and maintenance of barricades. Under exceptional circumstances a period of a lesser number of days may be stipulated by the engineer for exclusion of traffic. Failure to keep the entire surface continuously wet for five days as specified, or failure to erect and properly maintain barricades as specified in the preceding paragraph, will subject the contractor to a deduction of $20 for each day of such failure on each job where said failure may occur, which deduction shall be made as liquidated damages herein agreed to, and not as a penalty.

CONCRETE CURB.

93. *Composition.*—Concrete curb shall be composed of concrete proportioned 1 bag of specified cement, 2¼ cubic feet of specified sand, and 3⅜ cubic feet of specified gravel.

94. *Foundation.*—The space over which the concrete curb is laid is to be excavated and trimmed to a depth of at least 19 inches below the finished grade and for the full width of the curb. In the trench thus prepared a bed of bank gravel or coarse hard cinders will be spread to a depth of 6 inches and thoroughly rammed. The gravel and cinders must be free from excess of clay or loam and must be approved by the engineer.

95. *Construction.*—Forms must be put up for concrete curb and removed when the concrete is sufficiently set; and the face and top surface of the curb troweled or rubbed to a neat finish. The curb shall be cut in lengths of about 10 feet. It shall be constructed as shown in drawings on file in the office of the engineer of highways. The space at the back of curb is to be filled with earth up to the level of the curb for not less than 1 foot in width.

ADDITIONAL WORK.

96. *Specifications.*—Contractors must do such additional work incident to construction of new pavements as may be ordered upon each street by the engineer. Such work shall be done in accordance with current District specifications.

laterials.—Granite and bluestone curb, cobble, brick, and other paving will be furnished to the contractor free of cost to him at the District y yards or at other places of deposit. Any of these materials unac- l for or improperly disposed of or damaged or broken through careless illed handling will be charged against him to their value, and the loss to trict will be deducted from any amount due the contractor for work done, ermined by the engineer. Materials other than granite and bluestone bble, brick, and other paving blocks will be furnished by the contractor, t for such being included in the fixed price for the respective items as

rading.—Payment for the necessary grading connected with the items l under "Additional work" is included in the fixed prices stated below.

rices.—(*a*) Removing old curb, including haul not to exceed 2 miles, s per linear foot.

Hauling same beyond distance of 2 miles, 1½ cents per linear foot per nal mile or fraction thereof.

Removing cobble, flagstone, brick, and other paving blocks, including not over 2 miles, 30 cents per square yard.

Over haul on item *c*, 2½ cents per square yard for each additional one-mile or fraction thereof.

Hauling excavated material per 100 feet over an average distance of et. 1½ cents per cubic yard.

Resetting 6 by 20 granite and blue stone curb, 50 cents per linear foot.

Hauling and setting 8 by 8 curb on new concrete base, 70 cents per foot.

Adjusting manhole tops and basin covers to grade, $2.50 each.

Adjusting water-valve casings to grade, $5 each.

Dressing, jointing, and cutting curb, etc. (stonecutter's time), including up labor, $1.25 per hour.

Relaying cement walks, $2.75 per square yard.

Relaying brick walks, 40 cents per square yard.

Cleaning vitrified block and granite block for relaying, 50 cents per yard.

Relaying cobble or block gutters, 60 cents per square yard.

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Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1921

UNDER THE DIRECTION OF

COLONEL CHARLES W. KUTZ
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1921

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ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT OF COLUMBIA.

Colonel CHARLES W. KUTZ, *Corps of Engineers, United States Army, Engineer Commissioner.*
Major F. S. BESSON, *Corps of Engineers, United States Army, Assistant.*
Major CAREY H. BROWN, *Corps of Engineers, United States Army, Assistant.*
Captain JOHN E. WOOD, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONER.

RECORD DIVISION:
ROLAND M. BRENNAN, *Chief Clerk.*
WHARF COMMITTEE:
ROLAND M. BRENNAN, *Chief Clerk, Engineer Department.*
D. E. MCCOMB, *Engineer of Bridges.*
RUSSEL DEAN, *Harbor Master.*
DISTRICT BUILDING:
Major F. S. BESSON, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR BESSON.

HIGHWAYS (STREETS, ROADS, BRIDGES, ETC.):
C. B. HUNT, *Engineer of Highways.*
J. W. DARE, *Assistant Engineer of Highways.*
Sidewalks and alleys—
H. N. MOSS, *Superintendent of Streets.*
Construction and maintenance of suburban roads—
L. R. GRABILL, *Superintendent of Suburban Roads.*
Construction and care of bridges—
D. E. MCCOMB, *Engineer of Bridges.*
Engineer Department stables—
BART. J. LYNCH, *Superintendent.*
STREET AND ALLEY CLEANING, COLLECTION OF GARBAGE, ETC.:
MORRIS HACKER, *Supervisor of City Refuse.*
T. L. COSTIGAN, *Superintendent of Street Cleaning.*
ASPHALTS AND CEMENTS:
J. O. HARGROVE, *Inspector of Asphalt and Cements.*
TREES AND PARKINGS:
CLIFFORD LANHAM, *Superintendent of Trees and Parkings.*
MUNICIPAL GARAGE:
E. P. BROOKE, *In charge.*
CHARLES N. EMMONS, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR BROWN.

MUNICIPAL ARCHITECT:
ALBERT L. HARRIS.
Repairs to municipal buildings—
HENRY STOREY, *Superintendent of Repairs.*
SURVEYOR'S OFFICE (INCLUDING STREET EXTENSIONS):
M. C. HAZEN, *Surveyor.*
BUILDING INSPECTION:
JOHN P. HEALY, *Inspector of Buildings.*
Plumbing plans and inspection—
A. R. MCGONEGAL, *Inspector of Plumbing.*
Permits, Engineer Department—
H. M. WOODWARD, *Permit Clerk.*
Plumbing board—
P. C. SCHAEFER.
J. S. O'HAGAN.
SAMUEL TAPP.
Board of examiners of steam engineers—
E. F. VERMILLION.
H. BOESCH.
W. I. EVANS.
BOARD FOR CONDEMNATION OF INSANITARY BUILDINGS:
Major CAREY H. BROWN, *Assistant to Engineer Commissioner.*
Dr. W. C. FOWLER, *Health Officer.*
JOHN P. HEALY, *Inspector of Buildings.*

UNDER THE IMMEDIATE SUPERVISION OF CAPTAIN WOOD.

WATER DEPARTMENT:
J. S. GARLAND, *Superintendent.*
Water rates—
G. W. WALLACE, *Water Registrar.*
SEWER CONSTRUCTION AND MAINTENANCE:
ASA E. PHILLIPS, *Sanitary Engineer.*
ELECTRICAL DEPARTMENT:
WARREN B. HADLEY, *Electrical Engineer.*

EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1921.

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, October 1, 1921.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats., 108), a report of the official doings of that government for the fiscal year ended June 30, 1921.

* * * * * * *

ROADWAY PAVEMENTS.

The accompanying table shows the area, in square yards, of new roadway pavements laid and old roadway pavements resurfaced during the year, with the totals in square yards and miles of the various kinds of pavements at the close of the fiscal year.

Comparative statement showing character and extent of roadway pavements.

	Existing amount on June 30, 1920.		New pavement laid during year, square yards.	Replaced with asphalt.	Existing amount on June 30, 1921.	
	Square yards.	Miles.			Square yards.	Miles.
Sheet asphalt and coal tar	3,253,588	172.82	124,035	.....	3,377,623	179.98
Asphalt block	630,050	32.02	.....	4,377	625,673	31.74
Durax block	12,294	.30	5,674	.....	17,968	.57
Asphaltic or bituminous concrete:						
On concrete base	78,708	4.58	.....	.....	78,708	4.58
On broken-stone base	51,088	2.68	.....	.....	51,088	2.68
Cement concrete	222,123	11.82	41,352	13,257	250,218	13.45
Granite block and rubble	306,664	21.13	.....	[1] 29,068	357,596	19.59
Vitrified block	17,390	1.04	.....	.....	17,390	1.04
Cobble	54,646	2.53	.....	[2] 17,590	37,056	1.56
Macadam (estimated)	1,951,556	125.20	3,600	[3] 75,597	1,882,559	120.85
Gravel and unimproved (traveled)	.....	147.72	.....	.....	.....	148.88
Gutters on asphalt streets	242,237	.....	6,258	.....	238,495	.....
Pavements maintained by street railways	564,525	.....	.....	.....	564,525	.....
Gutters on asphaltic concrete streets	11,201	.....	.....	.....	11,201	.....
Total	7,469,070	522.13	180,919	139,889	7,510,100	524.92

[1] Includes 5,674 square yards replaced with Durax.
[2] Includes 2,176 square yards replaced with concrete.
[3] Includes 11,451 square yards replaced with concrete.

NOTE.—51,448.79 square yards sheet-asphalt and coal-tar pavements resurfaced, including 28,617.31 square yards asphalt surface on old base.

The sums appropriated for expenditures during the year under t head were as follows:

For repairing old roadway pavements, including asphalt resurfacing	$575,
For paving new roadways	569,
For repair of suburban roads	250,
For grading streets, alleys, and roads	30,

The cost of work showed but slight recessions. Toward the end the year the tendency was rather markedly downward, but the great portion of the work had been, of necessity, committed to contra obligations at prices little better than the recent past. Labor more was continuously improved, and difficulty in securing constructi material practically disappeared. For the first time the procedure w followed of surfacing with sheet asphalt concrete roadways laid in pa years whose surface conditions, due to use, justified the treatmen All our concrete roadways are constructed in anticipation of su treatment and on grades that allow for it. Four such streets we surfaced and the results were entirely satisfactory.

The prices paid under contracts for roadway pavements during t year were as follows:

	Per square ya
Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 6-inch concrete base	$3. 95, $3.
Laying vitrified block with 6-inch concrete base	3. 58, 3.
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 5-inch concrete base	3. 75, 3.
Laying vitrified block with 5-inch concrete base	3. 38, 3.
Laying 6-inch concrete roadway	2.

The prices paid for resurfacing and repairing asphalt pavemen under one-year contracts which expired June 30, 1921, are follows:

Laying sheet-asphalt pavement (2½ inch asphalt surface, 2 inch binder, before compression) with 6-inch concrete base, per square yard	$3.
Laying sheet asphalt surface (2½ inches before compression) per square yard	1.
Laying asphalt binder (in connection with resurfacing work) per cubic foot	
Laying sheet asphalt surface for repairs, etc., within the space required by law to be kept in repair by street-railway companies, per cubic foot	1.
Laying asphalt binder for repairs, etc., within the space required by law to be kept in repair by street-railway companies, per cubic foot	

SUBURBAN STREETS AND ROADS.

A notable item in the year's work was the grading of Connectic Avenue between Pierce Mill Road and Chappell Road, the grade ha ing been widened on both sides sufficiently to permit the constructi of footwalks and setting trees.

The suburban highways on which asphalt roadways were pave were Connecticut Avenue, 1 mile, and Nichols Avenue, one-half mil The roadways of Bowen Road and Bladensburg Road, for whi special appropriations of $21,000 and $51,000, respectively, we available, were surfaced with bituminous macadam by day labor aft efforts to secure bids for the work within the funds appropriated h failed.

All the concrete roadways which were authorized by appropriati were laid under contract at prices somewhat lower than those of la year. Our heavily traveled suburban thoroughfares should be pav with sheet asphalt on a concrete base as rapidly as funds can be s cured in the interest of economy and of public convenience a comfort.

MUNICIPAL ASPHALT PLANT.

The District of Columbia has operated a portable municipal asphalt plant in the repair of asphalt pavements and bituminous macadam roadways for the past 10 years. During the year of 1921 the plant was operated for a period of 248 days, with a total output of 215,832 cubic feet of material, or an average daily output of 870 cubic feet. Additional asphalt material for street repairs supplemental to that furnished by the asphalt plant was purchsed under contract from the Cranford Paving Co. to the amount of 43,113.2 cubic feet.

The details of the cost of the operation of the plant are contained in the report of the Engineer of Highways. The total cost of minor repairs to sheet asphalt pavements during the year, the same representing the maintenance costs during the year, was $122,141.83. This cost represented the maintenance of all asphalt streets not under guarantee by contractors, a total yardage of 3,253,588. The cost per square yard per year was therefore about 3.75 cents. The like annual cost for previous years was as follows:

	Cents.		Cents.
1911	2.20	1916	1.80
1912	2.40	1917	1.50
1913	2.00	1918	1.70
1914	1.90	1919	3.07
1915	1.90	1920	3.38

The increase of 1919, 1920, and 1921 over that of 1918 is entirely due to increased unit costs of labor and material.

SIDEWALKS AND ALLEYS.

The sum of $285,000 was appropriated for paving sidewalks and alleys in all parts of the District and the sum of $20,000 for laying sidewalks and setting curbs around Government buildings, reservations, and parks. Sidewalks are paved with cement concrete under contract. Twenty-three thousand five hundred and two square yards of cement concrete pavement were laid in various alleys.

One-half of the cost of curb, sidewalk, and alley pavement is assessed against the abutting property, except that abutting public buildings and public reservations. The contract price for laying sidewalks during the year was as follows:

For large jobs adjoining paved streets, per square yard	$2.11
For large jobs adjoining unpaved streets and for all small jobs, per square yard	2.27

The initiative in the matter of paving sidewalks and alleys is generally left with the owners of the abutting property, the commissioners requiring a majority petition for such work before it is ordered. Exceptions are made, however, in cases where, on account of public danger or other public reasons, the paving is demanded. The law requires the commissioners to advertise for two weeks their intention to lay sidewalks and curbs and to pave alleys and to give a hearing to the property owners affected. The work is ordered subsequent to such hearing when, in the opinion of the commissioners, it is necessary for public health, safety, comfort, and convenience. The demand for this class of construction is constant, and increased appropriations for this work could be advantageously expended.

BRIDGES.

The principal item of work prosecuted by the bridge departm during the past fiscal year was the completion of the reconstruct of portion of gravity and reinforced sections of the canal wall un contract with Hyde & Baxter at a cost of $24,451.31. A recent c tract has been awarded to the W. F. Brenizer Co. for the reconstr tion of an additional portion of the aforesaid wall and the work the under is now in progress. The Highway Bridge across the Potom River, until recently under the jurisdiction of the Office of Pub Buildings and Grounds, was turned over to the superintendence of t District Commissioners on May 1, 1921. One-half of the roadway the Anacostia Bridge at the foot of Eleventh Street was resurfa with asphalt by the Cranford Paving Co. under contract.

INSPECTION OF ASPHALTS AND CEMENTS.

In this office are made chemical and physical tests of materi entering into street and road improvements, such as asphalts, h draulic cements, sands, road oils, etc.; also fuel oils used at the m nicipal asphalt plant; cements used in sewer and building constr tions. Complete tests representing many subdeterminations w made as follows: Asphalt materials, 1,102; oils, 22; sands, stone, 94; pitch, 4; cements, 11,246, representing 112,517 barr miscellaneous materials, 725. Total, 13,288.

The samples of asphalts tested represent 1,836 tons of this mate of which 1,215 were used by those holding contracts for laying sh asphalt, 621 tons used in the production of paving materials at municipal asphalt plant. Of the materials tested there were rejec 1, 337 barrels of cement and 3,140 cubic yards of sand.

SURVEYOR'S OFFICE.

SURVEYS FOR PRIVATE PARTIES.

Under head of work done for private parties there was a v increase in the number of orders taken for the past year, there be 8,450 orders the past year as compared with 5,795 the preceding ye The total receipts for private work amounted to $25,355.82.

The last quarter of the past fiscal year shows that it was the larg quarter in the history of the office, the receipts during this peri alone amounting to $8, 828. 90.

A considerable increase in the number of lots surveyed and number of new lots created by subdivision was noted. There w 3,043 lots surveyed as compared to 2,756 the preceding year. T new lots created by subdivision totaled 2,814 against 1,703 for t preceding year.

A large increase was made in the number of plats for permits, th being 3,427 against 1,937 the preceding year. This increase w made necessary by reason of the zoning regulations.

The large tracts surveyed subdivided and recorded numbered the past fiscal year as compared to 13 for the preceding year.

MISCELLANEOUS WORK AND WORK FOR THE DISTRICT OF COLUMBIA.

The number of plats recorded in connection with condemnations d dedications totaled practically the same as the preceding year, ile the total number of plats drawn, including both public and ivate, was 8,204 the past fiscal year against 5,347 the preceding ar.

The total number of surveys, both public and private, was 4,378, compared to 3,018 the previous year, and the number of reports ade to the inspector of buildings based on the location of walls ing erected was 1,084 the past year and 1,175 the preceding year.

CONDEMNATION OF STREETS, PARKS, AND ALLEYS.

In connection with this work much detail work is necessary by is office, such as (1) the survey and preparation of plats, descripons, etc., for the opening, widening, or straightening of any streets alleys by condemnation, as well as the preparation of all dedicaon plats, and (2) attendance in court is required of an employee this office during condemnation proceedings.

Streets and parks.—There are now pending in court 15 street and rk cases, and 4 new cases have been ordered by the commissioners it not yet filed. During the past year 8 street and park cases ere confirmed.

Alleys.—Five alley cases are now pending in court, with 2 cases dered by the commissioners but not yet filed, and 11 alley cases ere confirmed.

The amount awarded as damages for all condemnation cases durg the past year was $49,465.65.

PARKS.

The original Federal city is famous for its street plan and for its eautiful parks. Outside the original city we have a highway plan r the entire District of Columbia, and all property which is subvided must conform to this plan. The entire District is therefore eing developed in accordance with a comprehensive and orderly reet plan, but there is no provision for parks outside the Federal ity except such as are acquired from time to time by special acts of ongress. This is usually not done, however, in accordance with ny plan that has been adopted. It is true that the McMillan park lan was submitted to Congress in 1902, providing for a plan outside f the cities of Washington and Georgetown, but there was no provision made for executing it, and land is being subdivided and improved with no consideration for this or any other plan. If this condition is permitted to continue over the entire District, many of the beauty spots of the District will be destroyed, and the District will be developed without any provision for parks. Much of this land is sparsely settled, and is comparatively cheap. These beauties should be preserved so that the citizens can walk and ride through them and the children play in the open and breathe the fresh air, to promote the health and happiness of our people. Many magnificent trees and lovely areas are being destroyed by subdivisions and improvements, thus creating the newer Washington without the liberal

park spaces provided in the older city. It is a reflection to say that the original designers of the old Washington showed greater foresight than the designers of the new Washington. These areas should be acquired for the health, recreation, and pleasure of our people.

It is gratifying to note that the committee on streets and parks of the Washington Board of Trade, of which the surveyor is a member, have had introduced in Congress bills providing for Piney Branch Parkway, Klingle Road Valley, and the Patterson tract. The necessity for the acquisition of these parks needs little comment. Their locations are ideal, they are covered with magnificent forest trees, and they are well distributed in different parts of the District. They have previously been approved by the commissioners, and should be included again, with the addition, it is thought, of extending the Fort Drives so as to include the old Civil War forts built for the defense of Washington, two of which have already been acquired, namely, Fort Davis and Fort Dupont.

ALLEYS.

The law which provides for the elimination of alley dwellers was suspended for one year after the ratification of the peace treaty. Since the close of the fiscal year it has become general knowledge that the peace treaty has been signed, and therefore the alley law will soon become effective. It would seem to be highly important that some action should be taken in regard to this law. Now that things are returning to normal, this alley problem as to alley dwellers should be prosecuted vigorously, as many of these alleys are densely crowded, insanitary, and a menace to the health and welfare of the community. They are breeding places for crime, where policemen dare not venture without endangering their lives. They harbor "bootleggers" and criminals of all classes, and on account of their accessibility form splendid hiding places for all who are engaged in the violation of the law.

TREES AND PARKINGS.

The number of trees planted along the curbs in the streets of the District of Columbia at the close of the fiscal year was 105,803, an increase over the preceding year of 404. The amount expended for the planting and care of trees during the year was $63,489.83.

About one-half of the trees planted were for the purpose of filling vacancies in existing rows in the northeast and southeast sections of the city, and the remainder were used in extending the lines into the suburbs and hitherto unplanted localities.

The nursery at Fort Dupont is well stocked with fine trees. This ground is well adapted for tree-nursery purposes, although there is not enough ground in this tract to grow a sufficient number of trees to keep up with the rapid growth of the city. During the fiscal year 108 pin oak, 874 red oak, 574 elm, 528 Norway maple, and 156 silver maple seedlings were planted in the nursery rows.

The systematic trimming of trees was resumed during the fiscal year, and as a result the dead wood and low limbs were removed from all trees on public space north of the Mall to Florida Avenue and west from Fourth to Eighteenth Streets NW.; also the low limbs were

moved from the trees on all streets north of Florida Avenue and st of North Capitol Street to Rock Creek; all streets in Cleveland rk, Chevy Chase, section east of North Capitol Street and north Florida Avenue NE., all streets in Twining City, Anacostia, and ngress Heights. The trees in the down-town section of the city e in need of severe trimming, topping off, etc., and it is hoped that s work can be undertaken in the near future. The total number trees trimmed during the year was 30,801.

REET AND ALLEY CLEANING AND COLLECTION AND DISPOSAL OF CITY REFUSE.

Two appropriations covered the operations of the city refuse vision. One of $375,000 for dust prevention, cleaning of streets d alleys, and snow removal, and the second of $750,000 for the colction and disposal of garbage, ashes, and miscellaneous refuse.

As in other branches of the service work was done at a reduced st over the cost of the last year due to growing labor efficiency rticularly noticeable in the latter months of the year.

On account of the mild winter no snow and ice work was necessary.

Sixty thousand and fifty-eight tons of garbage were collected during e year, an amount greater than ever collected before notwithstandg private individuals were permitted throughout the year to collect d transport this material to points outside the District of Columbia be fed to poultry and pigs. The cost of the municipal collection as $244,440.56. The revenue from grease and tankage produced om this garbage at the reduction plant was $155,196.61. The cost operation of the disposal plant was $196,162.74. The sum received om grease and tankage is small as compared with the two previous ears because of the unprecedentedly low prices prevailing for such roducts, particularly during the latter portion of the year. Since pril the price offered for tankage has not equaled the cost of prouction and in consequence the press cake has been piled and not old.

Because of the mild winter there was not the usual production of shes by householders. One hundred and thirty-three thousand ine hundred and forty cubic yards were collected as compared with 148,228 cubic yards the previous year.

During the past year the District collected the miscellaneous refuse and operated the salvage plant for the contractor who had failed the year before, but whose contract did not terminate until June 30, 1921. The revenue from salvage material amounted to slightly more than the cost of operating the disposal plant.

All of these services are becoming perceptibly more and more costly by reason of the difficulty in securing dumping places for waste material. It is believed the time has come where dumping ground must be acquired outside of the District of Columbia.

In the last three years the District has taken over as municipal functions the garbage, ash, and trash services. To improve these services urgent necessities are: A stable in the suburbs to shorten the haul of horse-drawn vehicles, a stable and wagon sheds to replace the present leased property where the horses used in the ash services are sheltered, a shop where repairs to all the equipment used in the several services would be made, a garage for trucks used in the garbage

service, the overhauling and remodeling of the present garb reduction plant, an up-to-date trash plant, with incinerator of l capacity, located in the industrial section along the railroad, and acquisition of property outside the District of Columbia for dum purposes.

BUILDING OPERATIONS.

The estimated value of building construction, including rep during the year was $18,999,926, a decrease of $3,638,936 as c pared with the fiscal year 1920.

The number of permits issued was 8,310, an increase of 785 previous year. This increase, however, was in repairs or alterati as in 1920 there were erected 741 more new buildings—352 dwelli 12 apartment houses, 377 business buildings.

A more or less chaotic state still obtains in the building trade; cost of materials and of labor continues high, and there seems present indication of normal conditions returning. Activity is coming more pronounced as the summer progresses, but it prob will be some time before a status of stability shall be gained.

The act to regulate the height, area, and use of buildings, c monly known as the zoning law, was approved March 1, 1920, the regulations promulgated thereunder became effective Au 30, 1920.

During the ensuing 10 months there were issued 4,150 confor certificates of occupancy and 450 nonconforming certificates, fees therefor totaling $2,400.

The wisdom of the zoning law is being convincingly demonstr almost daily, and not the least gratifying feature connected wit administration has been its general and enthusiastic indorsemen those whose financial interests, primarily at least, were adver affected.

CONSTRUCTION OF MUNICIPAL BUILDINGS.

During the year nine buildings were under construction, as lows: A four-room addition to the Deanwood School; an eight-r addition to the Petworth School; foundations and substructure the new Eastern High School; an eight-room addition to the B ville School; an eight-room building known as the John Burrou School; an eight-room addition to the Takoma School; an eight-r addition to the Joseph Rodman West School; a girls' cottage at National Training School for Girls, and the psychopathic group power house and domestic buildings for the Gallinger Munic Hospital.

Plans and specifications were completed for a four-room addi to the Henry D. Cooke School, and the contract for the construc of the same, executed June 30, 1921, calls for the completion of addition in December, 1921. Plans and specifications were comple for the remodeling of the Phelps School, and the contract for work, executed July 21, 1921, calls for the completion of the sam October, 1921.

Plans and specifications were prepared in this office for 40 provements to various school buildings, engine houses, and po stations.

REPAIRS TO MUNICIPAL BUILDINGS.

All municipal buildings are kept in repair under the direction of the municipal architect. During the year only such repairs were made would prevent further deterioration in the structures, as the continuation of high wages and high prices of materials prevented the ing of more extensive repair work with the funds that were available.

The appropriations for repair work and the expenditures of same re as follows:

For repairs to school buildings: Two hundred thousand dollars was propriated, and all was expended but $250.25. Requests for repairs submitted by the school authorities amounted to about $400,000.

Sixteen thousand dollars was appropriated for repairs to engine ouses, and all but $3.52 expended.

Eight thousand dollars was appropriated for repairs to police stations, and all was expended but $36.33.

Five thousand dollars was appropriated for repairs to the police urt building, and all was expended but $4.45.

In addition to the above, repairs were made on various buildings nder the control of the commissioners to the amount of $65,864.13.

Steam boilers in 89 District buildings were inspected and repaired.

WORKHOUSE AND REFORMATORY.

During the year very extensive repair work was done to the old ooden wharf at the Ninth Street property yard in Washington, and stretch of the old wharf on Occoquan Creek was rebuilt. The raiload from Occoquan Creek to the commissary was put into excellent ondition, and the brick building for a shelter and repair shop for he locomotive was built. The railroad between the reformatory nd workhouse was carried across Giles Run, and the Giles Run culert almost completed. The permanent buildings at the reformatory ave progressed steadily. The new brick boiler house and two-amily cottage at the workhouse were completed. As usual, extenive and continual repairs were necessary to all of the old wooden uildings at the workhouse.

THE DISTRICT BUILDING.

The routine work incident to the maintenance of the District Building involves several distinct functions, viz., the power plant; woodworking, paint, and electrical shops; blue-print and photo shops; printing shop; and the elevator, watch, and cleaning forces. During the year 2,155 tons of coal were consumed. Eight hundred and ninety cubic yards of ashes were removed, at a cost of $800. The electric current used by the various departments for purposes other than lighting amounted to 93,514 kilowatts. The print shop completed 358 orders for printing, totaling $8,101.73, while the blue-print and photographic shop completed 18,582 square feet of blue printing and 1,600 photographs at a total cost of $3,318.07. There was purchased and installed a Pease blue printer at a cost of $700. Because of the congestion brought about by the growth of old departments and the creation of new departments additional floor space should be provided, either by making an addition to the District Building or by acquiring adjacent property.

MUNICIPAL GARAGE.

During the fiscal year ended June 30, 1921, there were maintained and kept in running condition 43 automobiles. The garage was kept open day and night, all machines being washed and supplied with gasoline and oil by the night force, who also served as watchmen. The labor and mechanical force consisted of eight men. Their duties consisted of keeping up the repair work or driving for departments which were without chauffeurs and of carrying the mail from the city post office to the District Building. The total cost of maintenance and repair of the 43 automobiles, including gasoline, oil, miscellaneous supplies, and labor amounted to $20,200.84, or an average of $469.78 for each car, or $0.077 per mile. The total cost of repair parts was $4,052.13, an average of $94.23 per car, or an average of $0.0153 per mile. The average mileage per car was 6,139 miles.

PLUMBING INSPECTION DIVISION.

The plumbing inspector's force made a total of 41,750 inspections during the year, this being an increase of 60 per cent over the number recorded last year. About one-third of this number of inspections was caused by complaints of defective plumbing and drainage. This was an average of nearly 15 inspections per day per man on duty, and the largest number of inspections in any one day was 36.

It is estimated that plumbing construction and repair work in the District of Columbia (not including work done by the United States Government) amounted to about $2,500,000.

There were 38 cases of violation of law prosecuted in police court, but 1 of which was dismissed. The total amount of fines collected was $448.

This division handled 181 cases submitted to it by various departments under the nuisance and drainage act, and found it necessary to do the work under the assessment system in only 17 of them.

PLUMBING BOARD.

The plumbing board held 24 meetings and examined 77 candidates, only 13 of whom passed and were recommended for license.

PUBLIC CONVENIENCE STATIONS.

Four convenience stations were open from 6 a. m. until midnight throughout the year and during that time are estimated to have accommodated nearly 11,000,000 persons, the women using the stations about one-eighth as much as the men. The cash receipts for the year, consisting of fees received from the use of pay toilets, rental of clean towels, commission on telephone service, etc., amounted to $8,882.17.

INSPECTION OF STEAM BOILERS.

The number of steam boilers inspected by the inspector of steam boilers during the year was 476, including 30 belonging to the District of Columbia. Two boilers were condemned as unfit for further use. The compensation of the inspector of steam boilers is paid from fees

llected from owners of the boilers. The total amount of fees reorted by that official was $2,380, and the expense of inspection $350, aving a net compensation to him of $2,030.

EXAMINATION OF STEAM ENGINEERS.

The board of examiners of steam engineers held 52 examinations d examined 168 applicants, of whom 77 were found competent and incompetent.

STREET LIGHTING.

There are 20,342 street lamps of all kinds in the District of olumbia, as follows:

s, mantle		10,581
lectric, arc:		
6.6-ampere magnetite	282	
4.0-ampere magnetite	497	
		779
lectric, incandescent:		
250-candlepower, series	14	
200-candlepower, multiple	64	
100-candlepower, series	4,044	
100-candlepower, multiple	98	
60-candlepower, series	3,917	
60-candlepower, multiple	269	
		8,406
treet designation:		
Gas, 2½-foot, flat flame	397	
Electric, 8-candlepower	179	
		576
Total		20,342

This was a net increase during the year of 342 lamps.

Additions and extensions have necessarily been confined to some f the more pressing demands in newly occupied unlighted streets, n streets and alleys of enlarged occupancy, at special points equiring additional safeguarding of traffic and in connection with certain street improvements, where a deferment of needed changes in lighting would have been an economic waste. Of the 533 lamps newly connected (gross), 322 were either "designation," or the lowest powered gas or electric.

The improved incandescent electric lighting was extended during the year by the installation of 39 lamps, replacing less effective incandescents on Calvert Street and Connecticut Avenue NW. from Calvert Street Bridge to Cathedral Avenue; 32, replacing gas on New Hampshire Avenue NW., from Twenty-seventh Street to Washington Circle; 61, replacing gas on Massachusetts Avenue NW. from Dupont Circle to S Street, including Sheridan Circle; 29, replacing arcs on Louisiana Avenue NW. from Eighth to Tenth Streets; and 9 scattering.

The change of type of glass street designation signs, to improve legibility, has progressed to upward of 40 per cent of completion.

As to the several suits brought by the District of Columbia against certain railroad companies to recover in repayment for sums expended or the lighting of streets, avenues, etc., adjacent to the respective ights of way of such companies, the necessary retrial previously eferred to has not been reached and the situation remains essentially s reported a year ago.

SIGNAL SYSTEMS—FIRE ALARM TELEGRAPH, POLICE PATROL SIGNAL, AND TELEPHONE SERVICE.

There were 714 fire-alarm boxes in service at the end of the year, 613 on underground and 101 on overhead wires, a net increase of 19 over the preceding year; 858 box fire alarms and 916 local alarms were received during the year, of which 112 box and 33 local were false. Additional apparatus for fire-alarm headquarters, under contract, had not been received at the end of the year.

There were 475 police patrol boxes in service at the end of the year, 378 on underground and 97 on overhead wires, an increase of 11 over the preceding year.

There were 1,427 telephones connected to the District system at the end of the year, and 27 in use as portable sets by fire and electrical departments, an increase of 36 in the year.

The number of cells of storage battery in service on fire alarm, police patrol, and local circuits remains unchanged at 2,174.

There were in service on the composite signal systems on June 30, 1921, 163.24 miles of underground cable, containing 6,392.38 miles of conductors and 156.61 miles of aerial conductors, a grand total of 6,549 miles of conductor, a net increase of 32.33 miles of conductor, the amount of aerial conductor remaining unchanged. Certain of the trunk lines are overloaded, reserve capacity below safety requirements and desirable service impossible. Expansion is urgently required.

ELECTRICAL INSPECTION.

The total number of permits issued for installation of wires and apparatus for electric light, heat and power purposes, on private premises, not including distribution or other plant of public service companies, during the year, was 6,217, compared with 6,099 in the preceding year, representing approximately 6,933 kilowatts capacity of utilization equipment. The total amount of fees paid for permits for such installation was $11,626, compared with $10,596. The total number of inspections recorded relating to this work, was 16,170, compared with 14,965. These figures all show increase above the preceding year, which latter showed phenomenal increases over the next preceding year. The number of inspectors engaged in this important fire and accident prevention service has remained stationary for many years and an increase is essential to adequate and efficient functioning.

Supervision was exercised over the erection, taking down, moving, replacing, or resetting of an aggregate of 1,353 line and guy poles and of 197 pole guy anchors, and of the stringing of overhead wires in streets and other public spaces. The total of recorded wire-supporting poles in the District at the end of the year was: Line, 18,890; guy, 1,115; total, 20,005, compared with a total of 19,656 at the end of the preceding year, a net increase of 349. The telephone company has increased by 1 the number of its poles in streets within the area prescribed in the act of Congress regulating the use of telephone wires approved June 30, 1902.

The electrical department has cooperated with and assisted the municipal architect and other District officers, consulting and counseling, preparing plans and specifications, and supervising electrical work.

HARBOR FRONT.

The annual rental of wharves on the river frontage placed by r under the control of the commissioners are as follows:

omac River front	$18,618.60
acostia River front	400.00
Total	19,018.60

The actual water frontage of the District of Columbia devoted to mmerce, with the exception of canals, is about 2 miles. The total ailable water frontage is about 18 miles, of which about 8 miles set aside for parks and purposes of the United States. The largest ount of wharf property under the control of the commissioners along the Washington Channel. The total frontage along this nnel is 9,275 linear feet, of which 4,675 linear feet between the ounds of the War College and the south curb line of N Street are der the control of the United States. Of the remaining 4,600 ear feet, 4,041 feet are under the jurisdiction of the commissioners d 559 linear feet between Thirteenth and Fourteenth Streets has en designated by Congress as a site of the Federal central heating, hting, and power plant.

Along the frontage under the control of the commissioners are cated the harbor police station and dock, the dock of the fire boat, e District morgue, the municipal fish wharves and market, and the istrict workhouse and sand wharves. The balance of the frontage leased to private parties.

CONDEMNATION OF INSANITARY BUILDINGS.

The board for the condemnation of insanitary buildings held 14 eetings and issued orders for the repair of 255 and the demolition 156 buildings.

mber of buildings demolished located on streets	84
mber of buildings demolished located on alleys	72
mber of buildings repaired located on streets	40
mber of buildings repaired located on alleys	24

Since the creation of the board, May 1, 1906, there have been ,018 examined, of which 2,545 have been demolished and 1,912 epaired. The number of buildings demolished which were located n streets, 1,689; the number of buildings demolished which were ocated on alleys, 856; number of people required to secure other iving quarters through the action of the board during the year nded June 30, 1921, 1,055; number of people benefited by improvements required by the board since its creation, 6,836. Estimated value of repairs made during the year ended June 30, 1921, in response to orders issued by the board, $81,680.

Attention is invited to the act of Congress relative to the occupancy of alley dwellings.

Number of cases in court, one.

SEWERAGE SYSTEM.

The construction and maintenance of the sewerage system and the sewage disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer, District of Columbia.

The length of main and pipe sewers constructed during the year was 7.57 miles. The total length of main and pipe sewers on June 30, 1921, was 753.88 miles, of which 150.84 miles are main sewers and 603.04 miles are pipe sewers. There was expended during the year on the sewerage system the sum of $475,038.68, and on the sewage disposal system $51,377.25. The total cost of the sewerage system to June 30, 1921, was $15,101,797.68. The total cost of the sewage disposal system to the same date was $5,970,347.25, making a total cost of the complete system to June 30, 1921, $21,072,144.93.

SEWAGE DISPOSAL SYSTEM.

The main sewage pumping station was in continuous operation throughout the year, handling the sewage of practically the entire District and also the storm water from the 900-acre low area within the dike lines. At the main pumping station sewage to the amount of 25,000,000,000 gallons and 424,000,000 gallons of storm water were pumped during the year. The Poplar Point station handled 832,000,000 gallons of sewage and the Woodridge station 17,000,000 gallons of sewage during the year. The Rock Creek pumping station was completed, including the mechanical installation, and began the delivery to the disposal system of the sanitary drainage of the Upper Potomac on June 15, 1921.

WATER MAINS.

During the year 45,179 feet, or 8.5 miles, of water mains were laid, making a total length of mains now in service 647.5 miles. There were also in service at the end of the year 11,153 valves of various sizes, 3,730 fire hydrants, 238 public hydrants, 17 sanitary fountains, 154 horse fountains, and 44 public wells.

The aggregate cost of the water mains in service June 30, 1921 paid from water department funds, was $4,329,366.10.

WATER CONSUMPTION.

The mean daily consumption for the year was 61,506,830 gallons, being almost 1,400,000 gallons less than the mean daily consumption for 1920, making a per capita consumption of 140.5 gallons.

The total pumpage for the year was 11,359,892,730 gallons.

Underground leakage discovered and stopped during the year amounted to 990,430 gallons daily.

The total amount of coal burned was 7,466 tons.

The cost of operating pumps for the year was $118,195.29, making a total operative cost of pumping 1,000,000 gallons of water into the mains of $10.40.

WATER REVENUES AND EXPENDITURES.

The revenues from all sources, including a balance of $164,652.22, amounted to $1,317,424.62. Expenditures of the distribution system amounted to $902,632.29, advances on account of the Washington Aqueduct to $185,395.08, leaving a balance of $229,397.25. This balance is obligated to the amount of $41,503.43, which leaves an unobligated balance of $187,839.82.

Of the total cost of work done during the year, 34.4 per cent was for new work, and 65.6 per cent for maintenance.

WATER METERS.

During the year 974 water meters were installed. The continued increased cost of labor and material precluded the possibility of extensive work of this kind during the year. The average cost of installing meters for the year was $22.55.

The amount of revenue collected during the year under the meter system was $870,924.79; under the flat rate, $109,840.95; and for building purposes, $3,289.49.

The total number of services at the end of the year was 72,898, of which number 62,279, or 85 per cent, are metered.

Very respectfully,

CUNO H. RUDOLPH,
JAMES F. OYSTER,
CHARLES KELLER,
Commissioners of the District of Columbia.

REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA.

REPORT OF ASSISTANT ENGINEER COMMISSIONER BESSON.

WASHINGTON, *October 1, 1921.*

SIR: I have the honor to transmit herewith annual reports of the operations of the various divisions and offices under my immediate supervision for the fiscal year ended June 30, 1921.

Very respectfully,

F. S. BESSON,
Major, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.

The ENGINEER COMMISSIONER.

REPORT OF ENGINEER OF HIGHWAYS.

WASHINGTON, D. C., *August 20, 1921.*

SIR: I have the honor to submit the following report of the operations of the engineer of highways for the fiscal year ended June 30, 1921. The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the highway division aggregated $2,193,674.84, of which $285,000 was for paving sidewalks and alleys in all parts of the District; $569,200 for paving new roadways, $575,000 for repairing old roadway pavements, including asphalt resurfacing; $250,000 for repair of suburban roads; $32,500 for construction and repair of bridges and viaducts; $30,000 for grading streets and avenues; $20,000 for sidewalks and curbs around Government reservations, buildings, and parks; $45,000 for reconstructing the Canal Road wall; while $386,974.84 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

Summary of work under appropriation for improvement and repairs for year ending June 30, 1921

Character of work.		Street improvements.	Repairs to asphalt pavements.	Total.
heet-asphalt pavements	square yards	97,435.50	22,801.38	120,236.88
sphalt-surface pavements	do		28,647.41	28,647.41
itrified block gutter	do	6,157.93	1,229.72	7,387.65
ement concrete pavements	do	41,352.20		41,352.20
facadam roadway	do	3,600.00		3,600.00
ld pavement removed	cubic yards		1,268.18	1,268.18
ld cobble and granite removed	square yards	46,649.00		46,649.00
ranite and bluestone set	linear feet	36,143.59	1,794.90	37,938.49
ement curb formed and laid	do	11,999.63		11,999.63
urb reset	do	22,683.11	10,238.04	32,921.15
rading	cubic yards	51,285.40	1,478.50	52,763.90
ement sidewalks laid under assessment and permit work	square yards			41,500.57
ement sidewalks laid around Government reservations	do			7,892.67
lley pavements, assessment and permit work:				
Cement	do			23,502.71
Vitrified block	do			60.00

The following is a list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1921.
Tables B and C.—Statement of character and extent of street pavements.
Table E.—Street improvements.
Table F.—Repairs to asphalt and coal tar pavements.
Table G.—Work done for street railways companies.
Table H.—Work done by day labor under appropriation for "Repairs to str avenues, and alleys."
Table I.—Regular permit work.
Table K.—Assessment work.
Table L.—Replacing and repairing sidewalks and curbs around public reservatio
Table M.—Miscellaneous work.
Table N.—Whole cost work.
Table O.—Repairs to cuts by plumbers and others.
Table P.—Grading streets, alleys, and roads.

Of the above tables, B, C, and O are printed herewith. The re maining tables are on file in the record room of the office of the en gineer of highways, plan case No. B–1048.

The cost of work showed but slight recessions. Toward the end o the year the tendency was rather markedly downward, but th greater portion of the work had been, of necessity, committed to contract obligations at prices little better than the recent past. Labor morale was continuously improved and difficulty in securing construction material practically disappeared. Notable items of street improvement were the paving of Nichols Avenue from Sheridan Road to the southern entrance to St. Elizabeths Hospital; New Hampshire Avenue from I Street to Twenty-seventh Street; Louisiana Avenue from Tenth Street to Pennsylvania Avenue; and the east roadway of Connecticut Avenue from Chapel Road to the District Line. The resurfacing with bituminous macadam of Bladensburg Road from near M Street to the District Line at a cost of $55,886.27, and of Alabama Avenue, Pennsylvania Avenue to Ridge Road; and Bowen Road, Ridge Road to the District Line at a cost of $21,676.20 was done by day labor after efforts to secure bids for the work within the funds appropriated had failed.

For the first time the procedure was followed of surfacing with sheet asphalt concrete roadways laid in past years whose surface conditions, due to use, justified the treatment. All our concrete roadways are constructed in anticipation of such treatment and on grades that allow for it. Four such streets were surfaced and the results were entirely satisfactory.

Our heavily traveled suburban thoroughfares should be paved with sheet asphalt on a concrete base as rapidly as funds can be secured in the interest of economy and the public convenience and comfort. Except for a small fraction of our contract alleys and sidewalks and the rebuilding of the canal wall, also in progress under contract, the year's work is completed.

Alleys were paved with cement concrete to the extent of 23,50 square yards.

MUNICIPAL ASPHALT PLANT.

The total output of the municipal asphalt plant for the year wa 215,832 cubic feet of material, consisting of 195,336 cubic feet of ol material mixture, 3,624 cubic feet asphaltic concrete mixture, an 16,872 cubic feet of topping mixture. The plant was operated fo 248 days, with an average daily output of 870 cubic feet. In con

ion with the output of the plant the crusher was operated for 76 s during the year and 4,302 cubic yards of old material hauled he plant from various streets was crushed.

onstant attention is given to the maintenance of both the plant the crusher, repairs being made and parts replaced when neces-, thereby keeping them in the best operating condition possible. cost is incorporated in the total cost of output shown below.

he following materials in amounts set forth below were purchased se in manufacturing the output during the year:

tone dust, 190 tons, cost average	$4.40
, 3,382.50 cubic yards, cost average	2.01
ings, 25 tons, cost average	2.60
altic cement, 621.58 tons, cost average	24.61

here were purchased for use in operating the crusher and mixer following large items:

l oil, 28,612 gallons, cost average	$0.101
, 196 tons, cost average	9.25
d, 76 cords, cost average	19.80

The cost of operation, including labor and material, are kept from y to day and the summary of this data for the fiscal year develops following unit costs for the year's operation:

Operation of crusher.

[Period of operation, 76 working days; output of crusher, 4,302 cubic yards.]

bor and fuel	$6,549.29
Cost per cubic yard, $1.52.	
aintenance, renewals, and repairs	556.55
Cost per cubic yard, $0.129.	
verhead cost: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
st of crushed product per cubic yard:	
Labor and material	1.52
Repairs to plant	.129
Total cost	1.649

Operation of plant.

[Period of operation, 248 days; total output, 215,882 cubic feet.]

t plant:	
Labor (6.80 cents per cubic foot)	$14,678.14
Fuel oil (1.38 cents per cubic foot)	2,985.99
Coal (0.76 cent per cubic foot)	1,651.36
Wood (0.40 cent per cubic foot)	863.32
Total (9.34 cents per cubic foot)	20,178.81
aul from plant to street:	
Labor (8.46 cents per cubic foot)	17,686.28
n street:	
Labor (25 cents per cubic foot)	52,279.19
Painting joints (0.45 cent per cubic foot)	955.85
Wood (0.30 cent per cubic foot)	617.49
Total (25.75 cents per cubic foot)	53,852.53
aintenance and repairs:	
At plant (0.89 cent per cubic foot)	1,939.69
On street (0.11 cent per cubic foot)	231.20
Total (1 cent per cubic foot	2,170.89

Overhead: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

Supervision:

Foremen and overseers (3.55 cents per cubic foot)	$7.6[illegible]

Total manufacturing cost per cubic foot:	Cents.
Plant labor	[illegible]
Hot haul	[illegible]
Street work	25.[illegible]
Maintenance of plant and tools	[illegible]
Supervision	[illegible]
Total	48.[illegible]

The sand used was bought under contract at 80 cents per cubic yard and hauled from the wharf to the plant at the cost of $4,085.9[illegible] for 3,382.50 cubic yards, or $1.21 per cubic yard, a total of $2.01 per cubic yard. All other expendable material was delivered at the plant site at the cost thereof used herein.

The cost of a cubic foot of old material mixture from the above was as follows:

0.65 cubic foot of old material, at $1.65 per cubic yard	$0.0397
0.35 cubic foot sand, at $0.80 per cubic yard, hauled $1.21 per cubic yard	.0260
3.12 pounds limestone dust, at $4.40 per ton	.0069
4.58 pounds asphaltic cement, at $24.61 per ton	.0563
Cost of material	.1289
Manufacturing and placing cost	.4810
Total cost per cubic foot	.6099

Asphaltic concrete mixture:	
0.50 cubic foot screenings, at $2.60 per ton (2,000 pounds)	.0662
0.50 cubic foot sand, at $0.80 per cubic yard, hauled $1.21 per cubic yard	.0371
4.20 pounds limestone dust, at $4.40 per ton	.0092
9.16 pounds asphaltic cement, at $24.61 per ton	.1127
Cost of material	.2252
Manufacturing and placing cost	.4810
Total cost per cubic foot	.7062

Topping mixture:	
1 cubic foot of sand, at $0.80 per cubic yard, hauled $1.21 per cubic yard	.0742
4.20 pounds limestone dust, at $4.40 per ton	.0092
9.16 pounds asphaltic cement, at $24.61 per ton	.1127
Cost of material	.1961
Manufacturing and placing cost	.4810
Total cost per cubic foot	.6771

The total cost of minor repairs to sheet asphalt pavements during the year, the same representing the maintenance cost during the year, was $122,141.83. This cost represented the maintenance of all asphalt streets not under guaranty by contractors, a total yardage of 3,253,588. The cost per square yard per year was therefore about 3.75 cents.

For purposes of record and comparison the like annual costs are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 cents; *1919, 3.07 cents*; 1920, 3.38 cents.

municipal asphalt plant began operations in 1912, repairs made by contract during the first quarter of that year, and with municipal asphalt plant during the last three quarters of that year continuously since. The marked reduction for the year 1917 is d very significantly by the law effective that year by which to pavements over one year old are chargeable to repair appro- ns instead of being paid for by the paving contractors under year guaranty, as formerly. The yardage of pavement over our repairs were distributed was thus increased by nearly 0 square yards, on which practically no expenditures were d, as the pavements were only from one to five years old.

connection with these costs of annual repair it should be con- ed that some of the streets approximate an age of 40 years and t the average age of those we have resurfaced in recent past years xceeds 25 years. The average age of streets resurfaced in 1910 was 25.8 years; in 1911, was 24.5 years; in 1912, was 25.8 years; in 1913, was 26 years; in 1914, was 28.5 years; in 1915, 28 years; in 1916, was 29.6 years; in 1917, was 27 years; in 1918, was 26 years; in 1919, was 26.7 years; in 1920, was 23.6 years; in 1921 was 23 2 years.

During the year there was purchased from the Cranford Paving Co., under contracts Nos. 6798 and 6985, the following material in bulk at contractor's plant, to be used in connection with minor repairs to asphalt pavements and repairs to cuts:

1,792 cubic feet of topping, at 48 cents per cubic foot	$3,260.16
1,148.40 cubic feet binder, at 38 cents per cubic foot	2,336.39
15,216 cubic feet topping, at 56 cents per cubic foot	8,520.96
14,956.80 cubic feet binder, at 42 cents per cubic foot	6,281.86
Total	20,399.37

This material hauled from plant and laid in the streets by the District of Columbia minor-repair forces.

The reason for the above procedure was the abnormal need for repair work on our streets due to war activites and an effort to prevent their deterioration under such excessive use by heavy trucks and other increment of traffic. The plant alone could hardly have fully met such a demand and was not subjected to the injurious strain of attempting it. The prices paid for the material purchased were about equal to our own cost of production with a 15 per cent addition thereto.

STREETS.

Table H is a summary of work done by day labor under the appropriation for current repairs to streets, avenues, and alleys. The cost of such work was $133,659.98.

Table I is a list of work done under the permit system, wherein the property owners requested the improvement and paid one half cost, the District paying the other half. The cost was $41,037.49.

Table K is a list of work done under the assessment system. One-half of the cost of such work is charged against the abutting property. The total cost was $257,681.81.

Table L is a list of the work paid from the appropriation for replacing sidewalks and curbs around public reservations. The amount expended was $21,178.58.

These tables are on file in this office.

Repairs to streets, avenues, and alleys, appropriation 1921, under supervision of engineer of highways.

Brick sidewalk relaid	square yards	10,19[illegible]
Asphalt block paved	do	[illegible]
Asphalt block repaved	do	12,8[illegible]
Vitrified block paved	do	1,0[illegible]
Vitrified block repaved	do	4,0[illegible]
Macadam roadway	do	[illegible]
Curb reset	linear feet	1,9[illegible]
Flag relaid	square yards	[illegible]
Granite block laid	do	[illegible]
Cement walk relaid	do	3,5[illegible]
Cobble relaid	do	2,0[illegible]
Grading	cubic yards	4,8[illegible]
Labor		$121,675.[illegible]
Material		$11,983.[illegible]

SUMMARY.

Northwest section, east of Sixteenth Street	$31,844.[illegible]
Northwest section, west of Sixteenth Street	25,208.[illegible]
Northeast section	19,259.[illegible]
Southeast section	27,291.[illegible]
Southwest section	19,253.[illegible]
Georgetown	10,802.[illegible]
Total	133,658.[illegible]

SUBURBAN ROADS.

The work of this division for the year ended June 30, 1921, consisted principally of repairs and upkeep of approximately 150 miles of macadamized roads and streets, and 50 miles of gravel roads. Due to the conditions obtaining at the close of the war many of the roads were in bad condition, but by the autumn of 1920, normal conditions as to surface were about restored; and since that time there has been further improvement. Progress in betterment of conditions still remains slow, on account of the continuing high prices of labor and materials, combined with a steady increase of vehicular traffic. The increase in wear of road surfaces due to increased building construction and to heavier loads is noticeable.

The appropriation for repairs to suburban roads was $250,000; which was entirely expended, and in addition to this amount the appropriation for repairs to streets was drawn upon for repairs to many of the suburban streets. A tabulated statement of the items of work is submitted for filing.

In the matter of new construction on suburban streets, considerable progress was made in extending the paving of some of the trunk highways further outward from the city. The suburban highways on which asphalt roadways were paved, were Georgia Avenue, 60 feet wide, about 1 mile; Connecticut Avenue, 27 feet wide (one roadway only), 1 mile; and Nichols Avenue, 45 and 50 feet wide, about half mile. It is of great importance that these and other main highways should be permanently and completely paved at a date as early as possible.

The roadways of Bowen Road and Bladensburg Road, for which special appropriations of $21,000 and $51,000, respectively, were available, were surfaced with bituminous macadam by hired labor, no bids having been obtained which were within the appropriations.

otable item of the year's work was the grading of Connecticut ıe, between Pierce Mill Road and Chappell Road, the grade ; been widened on both sides sufficiently to permit the con- ion of footwalks and setting trees.

of the concrete roadways which were authorized by appropria- were laid under contract at prices somewhat lower than those ; year.

grading and graveling of Thirty-eighth Street SE. was delayed ndemnation proceedings, and was placed under contract. It e completed by the winter of 1921. All other work authorized ompleted.

recommendations made in the previous reports of this office 'e to the early paving of trunk highways, the use of bituminous lam on roadways of secondary importance, and as to restrictive tion limiting the weights of loaded vehicles, are respectively ed.

BRIDGES.

expenditures from the appropriation for the construction and of bridges were as follows:

Construction and repair of bridges.

.....	$27,923.74
ction of bridges.....	4,113.51
ls, tools, salaries, etc.....	16,053.84
Total.....	48,091.09
terials on hand purchased from appropriation from previous years..	18,395.68
Net expenditures.....	29,695.41
nent.....	2,326.21

ıy Bridge across Potomac River (turned over to commissioners, ict of Columbia, May 1, 1921): Labor, maintenance, and painting..	7,314.52
No. 1 (Chain Bridge): Reflooring in progress; incomplete, due to er shortage.	
No. 7 (Aqueduct Bridge): Refloored under authorization of the ed States Engineer Office.	
No. 20 (Pierce Mill Road over Rock Creek): Construction of new nent completed; reflooring and emplacing iron handrail completed; ray surfaced with asphalt under contract with Cranford Paving Co. cost of.....	619.78
No. 35 (M Street over Rock Creek): Reflooring completed; roadway ed with asphalt by District asphalt plant.	
No. 54 (Pennsylvania Avenue over Anacostia River): Reflooring leted.	
No. 55 (Eleventh Street SE. over Anacostia River): Repairs to fen- ompleted at a cost of.....	269.32
e-half of roadway resurfaced with asphalt at cost of.....	2,051.03
ıd gravel wharf: Repairs to bin completed at a cost of.....	808.43
No. 198 (Fiftieth Street NE. over Watts Branch): Contract No. 7096 ed into with Charles H. Tompkins for construction of a reinforced ete bridge; work completed Dec. 21, 1920, at a cost of.....	3,959.60
No. 6 (old ferry wharf on Water Street between M and W Streets :	
ıtract entered into with A. R. Thompson for removal of old build- ngs completed Sept. 20, 1920. The District received $611 for the ıaterial removed. Bids were requested for reconstruction of por- ion of revetment wall; all bids were rejected as excessive and the ork was performed by day labor at a cost of.....	12,259.55
ıtract No. 7162 entered into with the Dorsey-Miller Co. for removal f old piles, cribbing, etc., and driving new piles, including capping nd framing of same; work now in progress.	

Canal wall reconstruction:

Contract No. 6815 with Hyde & Baxter for reconstruction of portion of gravity and reinforced sections completed Apr. 26, 1921, at a cost of. $24,451.21

Repairs to canal wall at Fletcher's boathouse were completed by day labor at a cost of..... 1,567.14

Contract No. 7163 entered into with the Warren F. Brenizer Co. for reconstruction of portion of gravity wall; work now in progress.

Foot bridge in line of Fourth Street SE. over Oxen Run completed by day labor at a cost of..... 171.[illegible]

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

Very respectfully,

C. B. HUNT,
Engineer of Highways.

ASSISTANT TO THE ENGINEER COMMISSIONER.

TABLES B AND C.—*Character and extent of roadway pavements July 1, 1921.*

SQUARE YARDS.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete.	Durax block (small granite block).	Granite and rubble.
Northwest city	1,816,981	25,323	9,674	6,372	20,999	12,294	[illegible]
Northeast city	397,647	196,867	3,127	.....	11,825	.....	15,29[illegible]
Southeast city	234,736	249,000	8,019	4,082	1,324	.....	37,9[illegible]
Southwest city	285,938	40,436	13,535	.....	11,148	.....	149,6[illegible]
Georgetown	156,171	23,076	4,144	905	.....	5,674	33,[illegible]
Northwest suburban	382,575	84,046	25,855	36,680	163,049	.....	23,9[illegible]
Northeast suburban	82,372	6,925	14,354	.....	28,940	.....	.....
Southeast suburban	21,203	.....	.....	3,049	12,933	.....	1,000
Total	3,377,623	625,673	78,708	51,088	250,218	17,968	257,59[illegible]

Section.	Vitrified block.	Cobble.	Macadam (estimated).	Gutters on asphalt streets.	Gutters on asphaltic concrete streets.	Pavements maintained by street railroads.	Total.
Northwest city	9,855	6,445	22,517	119,469	1,128	287,110	2,434,794
Northeast city	3,882	.....	36,659	31,584	231	69,316	769,427
Southeast city	.....	13,122	46,700	16,640	898	48,328	660,454
Southwest city	3,138	7,070	10,300	24,515	1,254	56,820	603,792
Georgetown	515	10,419	3,000	5,979	498	31,816	272,698
Northwest suburban	.....	.....	1,304,240	28,159	5,871	54,765	2,109,185
Northeast suburban	.....	.....	385,481	5,764	1,049	9,000	535,885
Southeast suburban	.....	.....	73,662	6,385	272	7,370	125,874
Total	17,390	37,056	1,882,559	238,495	11,201	564,525	7,510,109

MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete.	Durax block (small granite block).
Northwest city	93.38	1.57	0.51	0.24	1.15	0.2[illegible]
Northeast city	20.84	8.74	.19	.....	.80	.....
Southeast city	12.61	12.40	.43	.17	.09	.....
Southwest city	15.48	2.37	.68	.....	.36	.....
Georgetown	9.30	1.51	.49	.06	.....	.....
Northwest suburban	21.39	4.52	1.31	2.00	8.89	.....
Northeast suburban	5.15	.63	.97	.....	1.65	.....
Southeast suburban	1.83	.....	.....	.21	.51	.....
Total	179.98	31.74	4.58	2.68	13.45	.5[illegible]

BLES B AND C.—*Character and extent of roadway pavements July 1, 1921*—Contd.

MILEAGE—Continued.

Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unimproved (estimated).	Total.
rthwest city	5.45	0.50	0.12	1.00	2.54	106.76
rtheast city	.91	.24	.....	1.98	4.29	37.99
itheast city	2.19	.....	.66	2.21	7.07	37.83
rthwest city	7.75	.27	.30	.52	2.62	30.35
orgetown	2.12	.03	.48	.06	.76	15.08
rthwest suburban	1.13	.....	.....	81.77	52.23	173.24
rtheast suburban	.....	.....	.....	27.63	43.00	79.03
itheast suburban	.04	.....	.....	5.68	36.37	44.64
Total	19.59	1.04	1.56	120.85	148.88	524.92

ABLE O.—*Number of square yards and cost of repairs to cuts in various streets, sidewalks, and alleys during the fiscal year ending June 30, 1921, chargeable to various plumbers, corporations, individual depositors, and appropriations of the District and Federal Governments.*

	Flat rate.	Whole cost.	Total.
Plumbers	$16,988.61	.....	$16,988.61
Corporations	76,385.08	$185,338.62	261,723.70
Individual depositors	9,825.85	.....	9,825.85
Various appropriations of the District and Federal Governments	36,806.63	61,630.05	98,436.68
Total	140,006.17	246,968.67	386,974.84

SQUARE YARDS REPAIRED.

	Flat rate.	Whole cost.
Sheet	4,278.25	6,361.57
Vitrified block	1,426.20	3,814.51
Asphalt block	2,229.88	7,834.59
Granite block	930.48	9,722.64
Cobble	370.46	1,101.57
Cement	13,223.32	.....
Brick	[1] 21,942.00	4,086.26
Macadam	1,595.49	2,684.00
Durax block	40.00	11,169.53
Scoria block	43.39	2,037.40
Wood block	2.00	188.11
Concrete roadways	1,189.06	287.29

[1] Feet.

REPORT OF THE INSPECTOR OF ASPHALTS AND CEMENTS.

WASHINGTON, *August 18, 1921.*

SIR: I have the honor to submit the following report showing the operations of this division during the fiscal year ending June 30, 1921.

The work of this division represented by the number of tests made show an increase of approximately 65 per cent as compared with the previous year, the principal increase being in testing hydraulic cements—11,246 samples against 5,961 submitted during the previous year.

There was also an increase in the number of miscellaneous samples, principally old asphalt surface materials, sands, asphalts and various mixtures prepared in connection with special experiments conducted under your personal supervision.

ASPHALT PAVEMENTS.

During the year there were laid by the Cranford Paving Co., contractors for the laying of new and resurfacing asphalt pavements, approximately 51,448 square yards in which Aztec and Standard asphalts were used.

The municipal asphalt plant produced about 198,960 cubic feet of asphalt-concrete and topping mixtures, used in the patching and repairs to asphalt pavements in which Standard asphalt was used.

The Corson & Gruman Co., contractors for laying new asphalt pavements, laid about 23,692 square yards in which Standard asphalt was used.

PORTLAND CEMENTS.

The testing of 11,246 samples, representing 112,517 barrels, of which 1,337 were rejected.

Results of tests and by whom submitted are shown in Tables Nos. 7 and 8 attached.

While the work during the year has increased, it has been kept current and is current to date.

Statements showing number of samples tested and examination of asphalts, asphalt cement, and other materials are on file in this office.

J. O. HARGROVE,
Inspector of Asphalts and Cements.

ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS.

WASHINGTON, D. C., *August 10, 1921.*

SIR: I have the honor to submit my fifth annual report dealing with the operations of the trees and parkings office for the fiscal year ended June 30, 1921.

TREES PLANTED.

Two thousand four hundred and fifty-five young trees were planted in their permanent position on the streets during the fiscal year, 141 less than the number planted the previous year. About one-half of the trees planted were for the purpose of filling vacancies in existing rows in the northeast and southeast sections of the city, and the remainder were used in extending the lines into the suburbs and hitherto unplanted localities. Of the number planted 2,430 were set at the curb line, 14 in the parking between the inner edge of the sidewalk and the building line, 8 in the central parking of Louisiana Avenue NW., between Ninth and Tenth Streets, 1 at the public comfort station, Fifteenth Street and Maryland Avenue NE., and 2 in the Langdon School yard. The work of preparing the tree spaces during the fiscal year was performed during the summer and fall months, and the planting of the trees in these spaces was undertaken last spring. It has been the custom of this department to plant trees at two different periods each year, namely, fall and spring. This is the time when trees are in what is known as their dormant state or period of rest. The planting of trees in the fall is advisable provided

the winter is mild. If the winter is severe the upheaval of the ground due to freezing and thawing is very injurious if not fatal to young trees. The planting of trees continues to be a costly item in view of the existing high price of labor and materials of all kinds, and the necessity for longer hauls due to the rapid growth of the city. The cost of planting 2,027 was paid for from the appropriation for the parking commission, 21 from appropriations for other departments, and 407 from whole cost deposits.

TREES REMOVED.

At the beginning of the fiscal year there were a great many dead trees standing on public space throughout the city, and an extra effort was made to remove the same. Around the 1st of April nearly all dead trees had been removed from public space. During the year all the Carolina poplar and silver-maple trees were removed from both sides of Shepherd Street NW., between Rock Creek Church Road and Georgia Avenue, and the same were replaced with 82 pin oaks. A total of 2,232 trees were removed during the fiscal year for various reasons.

Of the 2,232 trees removed during the year, 205 were decayed and dangerous; 122 were of inferior and condemned varieties; 9 to relieve excessive shade; 110 because of street improvements; 14 for driveways; 1 for vault; 16, improvements to alleys; 46 by accidents; 137, storms; 19, close proximity to buildings; 2, entrances to buildings; 16, interference with building operations; 27, interference with curb trees; and 10, parking improvements. It was ascertained that 32 trees were destroyed by illuminating gas, 38 by salt water, 128 by abnormal moisture supply, 51 by being filled around, 32 by being girdled, 6 by drought, 19 by insects, scale, borers, sycamore louse, etc., 54 by root mutilation, 2 by oil, 2 by sewer gas, 2 by being overshadowed, 34 by horse bite, and the deaths of 1,098 were unexplained.

Of the number removed 2,026 stood at the curb line, 7 in school grounds, 154 in the parkings, 25 in the sidewalk, 4 in the roadways, 14 in alleys, 1 on the grounds of the District of Columbia property yard, and 1 on the grounds of the crematorium.

The cost of removing 2,031 trees was paid for from the appropriation for the parking commission, 173 from the appropriations for other departments, and 28 from whole-cost deposits.

TREES SPRAYED.

It was necessary to perform the usual amount of spraying for leaf-eating insects during the year, and as a result 50,612 trees were sprayed for the extermination of the elm-leaf beetle, tussock moth, and the fall web worm. These trees were sprayed with arsenate of lead. In addition to spraying work performed for the destruction of leaf-eating insects, this office sprayed 2,910 trees with nicotine-sulphate near the end of May for the destruction of the aphis or plant lice. This insect made its appearance in unusually large numbers the past spring, and at one time the situation became a very serious problem. During the winter 5,529 trees were treated with lime-sulphur solution for the destruction of scale insects.

NURSERIES.

The nursery at Fort Dupont is well stocked with fine trees. This ground is well adapted for tree nursery purposes, although there is not enough ground in this tract to grow a sufficient number of trees to keep up with the rapid growth of the city. During the fiscal year 108 pin-oak, 874 red-oak, 574 elm, 528 Norway-maple, and 156 silver-maple seedlings were planted in the nursery rows, and they can be transferred to their permanent position on the streets in the next five to seven years.

TRIMMING.

It was impossible to undertake any systematic trimming of trees during the fiscal year 1920, owing to the scarcity of labor. This work, however, was resumed during the fiscal year 1921, and as a result the dead wood and low limbs were removed from all trees on public space north of the Mall to Florida Avenue and west from Fourth to Eighteenth Streets NW.; also the low limbs were removed from the trees on all streets north of Florida Avenue and west of North Capitol Street to Rock Creek; all streets in Cleveland Park, Chevy Chase, section east of North Capitol Street and north of Florida Avenue NE., and all streets in Twining City, Anacostia, and Congress Heights. These trees did not require any great amount of trimming except to remove low limbs to prevent their interference with pedestrian and vehicular traffic. In the down town section of the city the trees are older and many of these are in need of severe trimming, topping off, etc. This treatment is about the only remedy for the old silver maples as they are fast deteriorating, and will have to be removed from the streets in a few years as a matter of safety to the public. It is hoped that this work can be undertaken in the near future. A total of 30,801 trees were trimmed during the year.

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES.

At the beginning of the fiscal year nearly all small trees had received their usual spring cultivation, and this work was continued until they had been given attention. This work was resumed again the past spring, and at the close of the year a great many of the young trees had not been cultivated. This work will be continued until the entire tree-planted system has been given this yearly needed attention. A total of 4,396 trees were cultivated during the year.

The work of mowing the weeds on parkings abutting unimproved property was in progress at the beginning of the fiscal year. This work was performed at the same time the young trees were cultivated.

A total of 4,239 wooden tree boxes were removed during the year from trees which no longer required their protection.

PAVING OF ABANDONED TREE SPACES.

The work of paving abandoned tree spaces throughout the city during the year was performed by the surface division, engineer department, and the cost of the work paid from the appropriation for the parking commission. A total of $608.49 was spent on this work.

REGULATION OF TERRACES.

In addition to the inspections in cases pertaining to trees, this office examined and issued 635 permits affecting the grade of terraces in connection with building operations during the year.

Summary.

Curb trees on streets at close of fiscal year 1920	105,399
Net increase of curb trees during fiscal year 1921	404
Curb trees on streets at close of fiscal year 1921	105,803

Very respectfully,

C. LANHAM,
Superintendent of Trees and Parkings.

To the ASSISTANT ENGINEER COMMISSIONER.

REPORT OF THE CITY REFUSE DIVISION.

WASHINGTON, D. C., *August 6, 1921.*

SIR: I have the honor to submit the following report of the city refuse division, engineer department, for the fiscal year ended June 30, 1921.

Two appropriations covered the operations of this division, one of $375,000 for dust prevention, cleaning of streets and alleys, and snow removal, the second of $750,000 for the collection and disposal of garbage, ashes, and miscellaneous refuse.

STREET AND ALLEY CLEANING.

The yardage cleaned, the methods employed in this work, and the cost of each is shown in the tables accompanying this report.

The reduced cost per yard of this work is to be noted and is gratifying as indicating a growing labor efficiency, particularly noticeable in the latter months of the year.

On account of the mild winter no snow and ice work was necessary, but, as in the previous year, the refuse from Center, Western, and Eastern Markets was collected and disposed of as a street cleaning function at a cost of $1,006.94.

GARBAGE COLLECTION AND DISPOSAL.

Sixty thousand and fifty-eight tons of garbage were collected during the year, an amount greater than ever collected before, notwithstanding private individuals were permitted throughout the year to collect and transport this material to points outside of the District of Columbia to be fed to poultry and pigs. The cost of this collection was $244,440.56.

The revenue from grease and tankage produced from this garbage at the reduction plant was $155,196.61.

This sum is small as compared with the two previous years because of the unprecedentedly low prices prevailing for such products, par-

ticularly during the latter portion of the year. Since April the price offered for tankage has not equaled the cost of production, and in consequence the press cake has been piled and not sold.

The net cost of operation of the disposal plant was $194,162.74, so that the loss on the reduction service for the year was $38,966.07.

Notwithstanding this unfavorable showing, I am convinced that the safest and most economical disposition the District can make of the garbage produced within its limits is by the maintenance and proper upkeep and by the betterment of the reduction plant at Cherry Hill.

ASHES.

Because of the mild winter there was not the usual production of ashes by householders. One hundred and thirty-five thousand nine hundred and forty cubic yards were collected as compared with 148,228 cubic yards the previous year. The cost of this service was $116,421.04.

MISCELLANEOUS REFUSE.

During the past year the District collected the miscellaneous refuse and operated the salvage plant for the contractor who had failed the year before, but whose contract did not terminate until June 30, 1921. The revenue from salvaged material amounted to slightly more than the cost of operating the disposal plant. The prices received in July and August were abnormally high, but suddenly the bottom dropped out of the market, and since September prices have been abnormally low.

GENERAL.

All of these services are becoming perceptibly more and more costly by reason of the difficulty in securing dumping places for the waste material. In my last annual report I referred to this situation. Since that time there have been many requests from merchants and others for a public dump. Such facility is not obtainable in the District of Columbia. It is believed the time has come when dumping ground must be acquired outside of the District of Columbia. An incinerator of large capacity would be of service in reducing the waste material to a smaller bulk, but in any event property where waste material can be dumped is urgently needed.

Beginning April 1 a reduction of about 7 per cent was made in the wages of laborers throughout the service. The large proportion of the street-cleaning force was being paid $3.25 per day. They were reduced to $3.09 per day. Garbage collectors, paid $3.81 per day were reduced to $3.57 per day.

In the last three years the District has taken over as municipal functions the garbage, ash, and trash services. The wisdom of doing this work by day labor rather than by contract has been demonstrated, but further improvement in these services would result if this division was furnished with improved quarters for the stock and equipment used on this work. Appropriations have been sufficient to keep running, but funds have not been allowed for betterments such as new stables, which additions would not only secure better results in the several services, but would make them more economical to

operate. Urgent necessities are: a stable in the suburbs to shorten the haul of horse-drawn vehicles, a stable and wagon sheds to replace the present leased property where the horses used in the ash service are sheltered, a shop where repairs to all the equipment used in the several services would be made, a garage for trucks used in the garbage service, the overhauling and remodeling of the present garbage reduction plant, an up-to-date trash plant with incinerator of large capacity located in the industrial section along the railroad, and the acquisition of property outside the District of Columbia for dumping purposes.

It is hoped, further, that much deserved salary increases to annual employees of this division may be forthcoming. My acknowledgments are due them for the work accomplished by the office during the year.

Very respectfully,

MORRIS HACKER,
Supervisor City Refuse.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Cost of street cleaning July 1, 1920, to June 30, 1921.

	Area.	Cost.	
		Total.	Unit per 1,000 yards.
	Sq. yards.		
Machine cleaning	119,256,000	$48,237.93	$0.404
Alley cleaning	69,090,000	45,696.39	.661
Suburban cleaning	60,382,000	33,372.65	.549
Hand patrol	1,323,163,000	253,485.93	.192
Motor flushing	40,842,000	7,424.31	.182
Squeegeeing	127,596,000	27,684.70	.217
Sprinkling		6,048.10	
Dumpmen		5,963.09	
Property accounting		2,422.49	
Waste-paper boxes		1,684.67	
Snow and ice		2,688.15	
Annual overhead		3,115.42	
Total		437,823.83	

Yearly cost of cleaning by various methods.

Class of work.	Average 1,000 yards under attention.	Total cost.	Average cost for each 1,000 yards under attention for year.	1,000 yards cleaned.	Average number of cleanings for year.
Hand patrol [1]	4,606	$253,485.93	$55.03	1,323,163	287
Machine sweeping	862	48,237.93	55.96	119,256	138
Alley cleaning	1,151	45,696.39	39.70	69,090	60
Suburban streets	1,619	33,372.65	20.61	60,382	37
Squeegeeing	3,008	27,684.70	9.20	127,596	42
Motor flushing	903	7,424.31	8.22	40,842	45

[1] Hand patrol work is habitually in combination with squeegeeing and flushing.

Table showing comparative data in connection with street-cleaning work, 1917 to 1921.

SQUARE YARDS CLEANED.

	1917	1918	1919	1920	1921
Hand patrol	1,024,688,000	879,574,000	748,142,000	1,173,802,000	1,323,163,000
Machine sweeping	219,800,000	205,504,000	218,682,000	98,350,000	119,256,000
Alley cleaning	65,471,000	49,878,000	57,208,000	55,344,000	69,000,000
Suburban streets	58,940,000	38,393,000	32,876,000	34,550,000	60,282,000
Sqeegeeing	169,566,000	125,520,000	89,868,000	111,008,000	127,596,000
Flushing	27,485,000	16,776,000	5,539,000	24,433,000	40,842,000
Motor flushing	6,135,000	12,621,000	12,213,000		

DIRECT TOTAL COST.

	1917	1918	1919	1920	1921
Hand patrol	$148,401.40	$165,521.33	$195,665.33	$237,490.76	$253,485.93
Machine sweeping	37,583.20	49,242.68	77,555.50	40,915.64	48,237.93
Alley cleaning	24,221.64	30,018.51	45,118.53	44,239.33	45,696.39
Suburban streets	20,164.21	18,986.48	20,540.42	24,231.40	33,372.65
Sqeegeeing	20,560.73	21,141.04	20,929.32	24,743.81	27,684.70
Flushing	7,829.54	7,506.84	2,757.63	6,835.91	7,424.31
Motor flushing	721.60	3,964.29	4,418.61		

COST PER 1,000 SQUARE YARDS.

	1917	1918	1919	1920	1921
Hand patrol	$0.145	$0.189	$0.261	$0.202	$0.192
Machine sweeping	.171	.239	.354	.416	.404
Alley cleaning	.371	.603	.789	.800	.661
Suburban streets	.....	.....	.625	.702	.549
Sqeegeeing	.121	.168	.233	.223	.217
Flushing	.285	.450	.497	.279	.182
Motor flushing	.....	.314	.361		

Total cost of street cleaning, including all charges, except interest on investment and depreciation	[1] $437,823.83
Population served	410,000
Cost per capita per year	$1.07

[1] Includes bonus.

Table showing comparative data in connection with disposal of all city wastes from 1917 to 1921.

NUMBER OF UNITS COLLECTED.

	1917	1918	1919	1920	1921
Garbage ... tons	44,683	48,874	53,258	52,793	60,058
Ashes ... cubic yards	151,783	127,363	134,673	148,228	135,940
Miscellaneous refuse ... do	149,810	163,291	149,650	170,286	148,908
Night soil ... barrels	11,227	11,300	11,111	12,734	12,507
Dead animals ... number	24,562	22,891	19,974	19,995	24,704

TOTAL NET COST.

	1917	1918	1919	1920	1921
Garbage	$69,756.00	$69,290.00	$267,662.54	$178,311.57	$283,406.63
Ashes	59,052.00	68,922.64	100,300.00	114,248.38	116,421.04
Miscellaneous refuse	27,954.25	26,318.75	51,204.00	46,522.26	66,029.59
Night soil	14,994.00	14,998.00	17,500.00	17,500.00	17,500.00
Dead animals	2,988.00	2,988.00	3,360.00	3,360.00	3,360.00

Miscellaneous data on contracts.

Class of waste.	Contractor.	Period of contract.	Date of expiration.	Price per annum.	Collected from—
Dead animals	Charles F. Mann	5 years	June 30, 1923	$3,360	Every part of the District.
Night soil	Warner Stutler	do	do	17,500	All privies in the District.

REPORT OF THE MUNICIPAL GARAGE.

WASHINGTON, *August 29, 1921.*

SIR: I have the honor to submit the following report on the munic-
l garage for the fiscal year ended June 30, 1921.

The garage was necessarily kept open at all times, day and night,
urgent and necessary transportation.

There were maintained and kept in running order 43 automobiles
the various departments of the District government. All ma-
nes were washed and supplied with oil and gasoline by the night
e, which also served as night watchmen.

The labor and mechanical force consisted of eight men, whose duties
e repair work of all kinds, driving for departments which have
drivers assigned to them, and carrying the District government
il from the city post office to the District Building.

The total cost for maintenance and repair of these cars, including
oline, oil, miscellaneous supplies, and labor, amounted to $20,200.84.
erage cost per car was $469.78. Average cost per mile was $0.077.
The total cost of repair parts was $4,052.13, an average of $94.23
car, and an average of $0.0153 per mile. The average mileage per
was 6,139 miles.

The municipal garage was constructed during the year 1917 for
maintenance of approximately 25 cars, sufficient floor space being
owed for necessary repair work and cleaning of these cars. Addi-
nal purchases of new cars during the past four years have increased
number of cars for maintenance at the garage to 43, which necessi-
es the storing of cars overnight in the aisle; this makes it very
ficult for the night men to wash and supply gasoline to the cars.
mediate action should be taken for the relief of this crowded
dition.

E. P. BROOKE, *In Charge.*

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF ASSISTANT ENGINEER COMMISSIONER BROWN.

WASHINGTON, *October 1, 1921.*

SIR: I have the honor to transmit herewith annual reports of the
rations of the various divisions and offices under my immediate
ervision for the fiscal year ended June 30, 1921.

Very respectfully,

CAREY H. BROWN,
Major, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.

To the ENGINEER COMMISSIONER.

REPORT OF THE SURVEYOR.

WASHINGTON, *September 2, 1921.*

SIR: The report on the work of this office for the year ended June
1921, is hereby submitted for the information of Congress, which
ludes also the condemnation of streets, parks, and alleys.

This work is divided into three parts:

(1) Work for private parties for which a fee is charged.

(2) Work for the various departments of the District of Columbia and the Federal Government for which no fee is charged.

(3) The survey, preparation, and report on all condemnation cases for streets, alleys, and parks.

The work done for private parties for which a fee is charged will show a vast increase in the number of orders taken over the preceding year, there being 8,450 this year as compared with 5,795 for the past year. The total receipts for private work was $25,355.82.

The work for the last quarter of the past fiscal year shows it to be the largest quarter in the history of the office. The receipts during this period alone amounted to $8,828.90, and the present indications are that this will continue, and will place an amount of work upon the office force greater than can be performed and at the same time render the service to the public that should be rendered.

A considerable increase in the number of lots surveyed and the number of new lots created by new subdivisions is shown by the following figures:

Lots surveyed, 3,043, against 2,756 the previous year.

Lots created by subdivision, 2,814, against 1,703 the previous year.

Under the new zoning regulations the number of plats prepared for building operations has greatly increased, there being 3,427, against 1,937 the previous year. This work must be done immediately in order that the necessary permits can be secured by the owners, so that the work can be started by them without delay.

Considerable activity has taken place in the undeveloped unsubdivided part of the District, which is indicated by a number of very large subdivisions as follows:

Winfield and Baker, trustees, subdivision (addition to Hampton Park) creating 10 new squares;

Gordon and Newlands' subdivision creating 21 new squares;

McCormick and Childress, executors and trustees, Orren G. Staples estate, subdivision creating 13 new squares;

William S. Phillips' subdivision (Villa Flora) creating three new squares;

Charles G. Taylor's subdivision creating eight new squares; and the

Overlook Development Co. et al. subdivisions creating seven new squares.

The subdividing of these large agricultural tracts involves a great amount of work, such as surveying the entire outlines of the tracts and marking all block corners with stone monuments, in addition to the office work of computing and drafting and drawing up final subdivision plats and certificates.

HIGHWAY MAP OF THE DISTRICT OF COLUMBIA.

During the past year a new highway map of the District was prepared, involving a great amount of drafting work. This is very complete, showing the entire District divided into blocks, existing streets, and the proposed streets in accordance with the highway plan. The large park areas are shown colored in green.

This map has been lithographed and 3,000 copies made for distribution to the public for a fee prescribed by the commissioners

WORK DONE FOR THE VARIOUS DEPARTMENTS OF THE DISTRICT OF COLUMBIA AND FOR THE FEDERAL GOVERNMENT.

The work done for the various departments of the District government amounted to about three times as much as that done the previous year, which includes such work as staking off new streets and alleys, locating obstructions, and the location of insanitary places, such as stagnant pools, etc., for the health department.

Much information was furnished in connection with the extension of the Walter Reed Hospital reservation, and the office of Public Buildings and Grounds in connection with the condemnation for the Rock Creek Park connection.

CONDEMNATION OF STREETS, PARKS, AND ALLEYS.

In connection with this work, before the cases are finally disposed of in court, much detail work is necessary by this office, such as (1) a survey and the preparation of plats, descriptions, etc., for the opening, widening or straightening of any streets or alleys by condemnation, as well as the preparation of all dedication plats; (2) also attendance in court is required of an employee of this office during the condemnation proceedings.

There are now pending in court 15 street and park cases, and 4 new cases ordered by the commissioners but not yet filed. During the year 8 have been confirmed. Five alley cases are now in court, with 2 new cases ordered but not yet filed and 11 alley cases confirmed.

In connection with this work damages to the amount of $49,465.65 for land taken have been allowed by the juries in condemnation cases for streets, alleys, and parks.

A table showing the street, park, and alley cases filed, pending in court and confirmed during the past year, is on file in this office.

PARKS.

The original Federal city is famous for its street plan and for its beautiful parks. Outside of the original city we have a highway plan for the entire District of Columbia, and all property which is subdivided must conform to this plan. The entire District of Columbia is therefore being developed in accordance with a comprehensive and orderly street plan, but there is no provision for parks outside of the Federal city except such as are acquired from time to time by special acts of Congress. This is usually not done, however, in accordance with any plan that has been adopted. It is true that the McMillan park plan was submitted to Congress in 1902, which provides for a park plan outside of the cities of Washingtown and Georgetown, but there is no provision for executing it, and land is being subdivided and improved with no consideration for this or any other plan. If this condition is permitted to continue over the entire district, many of the beauty spots of the District will be destroyed, and the District will be developed without any provision for parks. Much of this land is sparsely settled, and is comparatively cheap. These should be preserved so that the citizens can walk and ride through them and the children play in the open and breathe the fresh air, to promote the health and happiness of our people. Many magnificent trees and

beauty spots are being destroyed by subdivisions and improvements, thus creating the newer Washington without the liberality of the park spaces as provided in the older city. It is a reflection to say that the original designers of the old Washington showed greater foresight than the designers of the new Washington. These areas should be acquired for the health, recreation and pleasure of our people.

It is gratifying to note that the committee on streets and parks of the board of trade, of which the surveyor is a member, have had introduced in Congress bills providing for Piney Branch Parkway, Klingle Road Valley, and the Patterson tract. The necessity for the acquisition of these parks needs little comment from me. Their locations are ideal, they are covered with magnificent forest trees, and they are well distributed in different parts of the District. They have previously been approved by the commissioners, and should be included again, with the addition, I think, of extending the Fort Drives so as to include the old Civil War forts built for the defense of Washington, two of which have already been acquired, namely Fort Davis and Fort Dupont.

ALLEYS.

The law which provides for the elimination of alley dwellings was suspended for one year after the signing of the peace treaty. Since the close of the fiscal year it has become general knowledge that the peace treaty has been signed, and therefore the alley law will soon become effective. This office has already made recommendations for certain changes which are believed to be desirable. It would seem to be highly important that the commissioners take some action in regard to this law.

Now that things are returning to normal, this alley problem as to alley dwellings should be prosecuted vigorously, as many of these alleys are densely crowded, insanitary and a menace to the health and welfare of the community. They are breeding places for crime where policemen dare not venture without endangering their lives. They harbor "bootleggers" and criminals of all classes, and on account of their inaccessibility, form splendid hiding places for all who are engaged in the violation of the law.

Very respectfully,

MELVIN C. HAZEN,
Surveyor.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF MUNICIPAL ARCHITECT.

WASHINGTON, *August 29, 1921.*

SIR: I have the honor to submit the twelfth annual report of the office of the municipal architect for the fiscal year ending June 30, 1921.

During the year nine buildings were under construction, as follows:

Deanwood School, No. 152, located at the corner of Whittingham and Lane Places NE. Appropriation: Contractual limit, for an eight-room building, including purchase of additional land, $190,000. Amount appropriated, $190,000. Contract was executed July 30, 1920, for the construction of an addition of four rooms and the making of certain alterations in the old building. This work was completed February 9, 1921, at a cost of $51,527.64.

Petworth School, No. 131, located at Shepherd and Eighth Streets NW. Appropriation: Contractual limit, $218,000. Amount appropriated, $218,000. Contract was executed July 17, 1920, for the construction of an eight-room addition to this building. The work was practically completed August 2, 1921, at a cost of $171,930. The contract for the heating work for this building was executed October 7, 1920, the contract price therefor being $36,938. The contract time for the heating expires October 11, 1921.

New Eastern High School, No. 176, located on East Capitol Street between Seventeenth and Eighteenth Streets NE. Appropriation: Contractural limit, $1,500,000. Appropriated, $640,000. Contract was executed September 10, 1920, for the work of making excavations for this building. This work was completed January 29, 1921, at a cost of $41,011. Contract was executed January 28, 1921, for the construction of the foundations and substructure of this building, in the sum of $295,940. The contract time for this work expires September 1, 1921, but application has been made for an extension of 90 days for the completion of the work.

John Burroughs School, No. 177, located on Monroe Street, between Eighteenth and Twentieth Streets NE. Appropriation: Contractural limit, $218,000. Amount appropriated, $210,000. Contract was executed December 19, 1920, for the construction of an eight-room addition to this building. The construction of the building to date has cost $167,086. Two boilers were purchased for the heating equipment, the cost of the same including hauling to building being $3,047.50. The contract time for the work on this building expires October 29, 1921.

Takoma School, No. 118, located at Piney Branch Road and Dahlia Street NW. Appropriation: Contractural limit, $218,000. Amount appropriated, $185,000. Contract was executed January 5, 1921, for the construction of an eight-room addition. The cost of the construction to date, including heating system, is $161,653. The contract time for this work expires September 8, 1921.

Burrville School, No. 170, located at Division Avenue and Hayes Street, Burrville, D. C. Appropriation: Contractual limit, $210,000. Amount appropriated, $210,000. Contract was executed February 9, 1921, for the construction of an eight-room addition. The cost of the construction of the building to date is $143,692. The contract time expires October 7, 1921. Contract for the heating system was executed April 8, 1921, and the cost of this installation to date is $25,500. The contract time for the heating work expires September 10, 1921.

Joseph Rodman West School, No. 163, located on Farragut Street, between Thirteenth and Fourteenth Streets NW. Appropriation: Contractual limit, $218,000. Amount appropriated, $200,000. Contract was executed February 23, 1921, for the construction of an eight-room addition to this building. The construction cost to date is $141,287. The contract time expires October 17, 1921. Contract for the heating system for this building was executed August 2, 1921, in the sum of $22,280. The contract time for this work expires September 17, 1921. Contract for the electrical work for this building was executed April 5, 1921. The cost thereof to date is $1,940. The contract time expires August 25, 1921.

National Training School for Girls, located at Reservoir and (duit Roads. Appropriation, $40,000. Contract was executed M 19, 1921, for the construction of a girls' cottage, in the sum of $31 The time for the completion of this work expires September 22, 1

Gallinger Hospital, located on Massachusetts Avenue, bet Eighteenth and Twentieth Streets SE. Appropriation: Contra limit, $1,500,000. Appropriated, $1,103,590. Contract was exec September 24, 1920, for the construction of the psychopathic gro buildings. The cost of this construction to date is $795,38 The contract time for work expires October 14, 1921. Contract executed May 19, 1921, for making excavations and constru foundations, substructures, and pipe tunnels for the power hous domestic building. The cost of this work to date is $149,209. contract time for this work expires November 20, 1921. Con was executed May 2, 1921, for construction of the underground s age and drainage system for the psychopathic group of build The cost of this work is $7,345. The work under this contract completed July 30, 1921. Contract was executed April 16, 192 electric lighting, power, and telephone wiring for the psychop group of buildings. The cost of this work to date is $12,575. contract time expires August 27, 1921.

Besides the plans and specifications for the above-named build plans, and specifications for 40 other pieces of work, such as he systems in engine houses, repairs to heating system in school build etc., were prepared in this office.

Public schools, District of Columbia, 1921, repairs to buildings.

Appropriation		$200,
Ten per cent for supervision on outside work [1]		2,
Equipment and stock on hand June 30, 1921		70,
Total		272,
Expended as follows:		
Carpentering	$30,010.78	
Tinning	22,801.67	
Heating, steam and hot air	50,895.34	
Plumbing	9,730.21	
Painting	22,162.19	
Glazing	5,232.21	
Grading	15,363.35	
Gas and electric work	8,254.00	
Miscellaneous (this item includes time of all drivers)	26,614.29	
Gas, electricity, ice, coal, telephones, and car tickets (pro rata share)	1,354.48	
Forage	5,605.19	
Engineer stable (pro rata share)	717.14	
Shop forms and upkeep of 1617 U Street	832.92	
Sand wharf (pro rata share)	82.81	
Equipment and stock on hand June 30, 1921	72,480.77	
Balance	250.25	
		272,3

[1] We do not charge 10 per cent for supervision on work under continuous appropriations ove the municipal architect has charge.

re department, District of Columbia, 1921, repairs to engine houses.

on		$16,000.00
as follows:		
tering	$5,033.77	
g	2,803.11	
g	1,349.99	
ng	1,400.94	
g	1,557.42	
g	232.28	
g	206.15	
l electric work	1,044.50	
aneous	193.10	
a charge for the upkeep of the engineer stables, hones, gas, electricity, ice, forage, coal, and main-ice of automobiles	771.05	
on hand	1,404.17	
e	3.52	
		16,000.00

Metropolitan police, District of Columbia, 1921, repairs to stations.

ion		$8,000.00
as follows:		
ter work	$1,261.14	
g	547.96	
g	3,869.19	
ing	606.10	
ng	348.34	
g	62.93	
g	159.33	
d electrical work	280.45	
aneous	167.00	
a charge for the engineer stables, telephones, gas, ricity, ice, forage, coal, and maintenance of auto-iles	570.00	
on hand	91.23	
e	36.33	
		8,000.00

Courts, District of Columbia, 1921, repairs to buildings.

ion		$5,000.00
as follows:		
tering	$163.50	
g	2,403.49	
g	77.84	
ing	92.92	
ng	928.62	
g	4.86	
d electrical work	922.47	
laneous	.90	
on hand June 30, 1921	400.95	
e	4.45	
		5,000.00

Work in addition to that on "Public schools, District of Columbia, 1921, repairs to buildings;" "Fire department, District of Columbia, 1921, repairs to engine houses;" "Metropolitan police, District of Columbia, 1921, repairs to stations;" "Courts, District of Columbia, 1921, police court, repairs to building."

Juvenile court	$159.10
Municipal court	109.60
Schools (other than repairs to buildings)	4,364.61
Playgrounds	416.55
Fire department (other than repairs to engine houses)	1,137.72
Police (other than repairs to stations)	2,462.36
Health department	1,029.81
Water department	319.43
Washington Asylum and Jail	2,216.51
Tuberculosis Hospital	101.92
Industrial Home School	1,990.68
Municipal lodging house	76.80
National Training School for Girls	846.97
Public convenience stations	1,349.55
Library	2,004.59
Markets	1,589.19
Coroner's office	897.63
Board of charities	473.10
Emergency fund	112.95
Electrical department	47.65
Parking commission	65.94
Improvements and repairs, streets	169.92
Sewers	160.48
Work on various construction jobs under continuous appropriations	43,761.07
Total	65,864.13

NOTE.—The above represents work which was done by this shop during the fiscal year 1921, upon written requests from the officials in charge of the various appropriations.

INSPECTION OF STEAM BOILERS.

During the fiscal year 1921 the District of Columbia repair shop inspected and repaired the steam boilers in 89 buildings owned by the District of Columbia.

Respectfully,

SNOWDEN ASHFORD,
Municipal Architect.

The ASSISTANT ENGINEER COMMISSIONER.

REPORT OF CONSTRUCTING ENGINEER, DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY.

LORTON, VA., *August 31, 1921.*

SIR: Following is the constructing engineer's report for the year ending June 30, 1921, for the workhouse and reformatory of the District of Columbia.

Conditions at the reformatory and the workhouse as regards the number and class of prisoners received during the past fiscal year were practically the same as noted in the last annual report.

The cost of each job of repair or construction for both the reformatory and the workhouse may be obtained in detail by a very laborious process of eliminating requisitions and charges for material and labor expended for maintenance, upkeep repairs, and construction not properly chargeable to permanent construction at the reformatory or repairs and construction at the workhouse.

A brief summation of each job follows:

Work at the District of Columbia Reformatory.

PERMANENT CONSTRUCTION.

Title.	Number of days prison labor.	Number of brick.	Cubic yards of sand and gravel.	Paid labor.	Bought material.	Cost previously reported.	Total chargeable to the appropriation.
[illegible]nent buildings	8,508	335,900	350	$5,825.94	$14,407.95	$793.58	$21,027.47
[illegible]motive house	(1)	27,350	12	8.00	643.02	46.53	697.55
[illegible] house	188			129.03	354.80	1,078.70	1,562.53
[illegible]k house	(1)			(1)	105.84	3,204.26	3,310.10
[illegible]r's residence No. 1	10			8.00	27.00	2,864.83	2,899.83
[illegible]cian's residence	340	2,500		372.31	2,881.60	10,166.98	13,420.89
[illegible]clerk	198			359.15	885.64	1,022.35	2,267.14
[illegible]road[2]	2,603	15,960	19	1,372.54	10,073.19	7,077.49	18,523.22
[illegible]ons	319				352.88		352.88
[illegible]tructing engineer's Ford truck					109.87	947.45	1,057.32
Chargeable to permanent							65,118.93

[1] See workhouse report. [2] See also workhouse report.

CONSTRUCTION AND REPAIR FOR ADMINISTRATION AND UPKEEP.

	2,399			$500.65	$3,729.45		$4,230.10

CENTRAL POWER PLANT.

	[2] 38			[2]$2,332.02	[2]$8,334.63	[2]$39,995.42	[2]$50,664.51

[2] See also workhouse report.

Work at the District of Columbia Workhouse.

Title.	Number of days prison labor.	Number of brick.	Cubic yards of sand and gravel.	Paid labor.	Bought material.	Cost previously reported.	Total chargeable to the appropriation.
[illegible]ntral power plant	614			$231.13	(1)		$231.16
[illegible]wo-family brick cottage	849	84,850	42	2,328.68	[1]$2,299.39	$68.75	4,696.82
[illegible]comotive house	469			[1]1,120.95	217.00		1,337.95
[illegible]pairs at the brickyard	272			769.37	2,678.34		3,447.71
[illegible]perintendent's residence	83			252.62	718.02		970.64
[illegible]ysician's residence	111			261.15	(1)	(1)	261.15
[illegible]g Louise	8			119.92	539.02		658.94
[illegible]nth Street wharf	20			441.24	573.34		1,014.58
[illegible]w boiler house	227			450.54	1,892.03	2,395.17	4,737.74
[illegible]ork at shipyard	367			605.33	4,198.86		4,804.19
[illegible]ork on railroad and railroad [illegible]restles	1,592			1,578.61	793.70	925.53	3,297.84
[illegible]sistant superintendent's residence	42			155.05	267.77		422.82
[illegible]uit cellar	125	12,000	20	297.28	314.15	663.88	1,275.31
[illegible]male department	157			316.88	329.91		646.79
[illegible]formatory	56			233.35			233.35
[illegible]eeching Pollock house	34			[1]98.68	(1)	(1)	98.68
Total							28,135.67

CONSTRUCTION AND REPAIR FOR ADMINISTRATION AND UPKEEP.

	2,690	500	3	$7,309.45	$5,804.33		$13,113.78

Total chargeable to the appropriations this year $41,219.45

See reformatory report.

Respectfully submitted.

C. B. BACKUS,
Constructing Engineer.

The MUNICIPAL ARCHITECT.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, *July 30, 1921.*

SIR: I submit herewith annual report covering the transactions of the building division during the fiscal year ended June 30, 1921.

No report of Federal Government operations has been received during the year.

Statement of permits issued from July 1, 1920, to June 30, 1921.

	Number.	Value.
Brick:		
Repairs	1,878	$2,467,070
Dwellings	467	4,577,100
Apartments	13	2,058,000
Stores	63	381,900
Warehouses	10	177,600
Garages	575	676,247
Automobile college	1	160,000
Banks	3	120,000
Factory and bottling works	1	50,000
Manufacturing plant	1	50,000
Newspaper office	1	750,000
Post office	1	1,250
Churches	8	738,360
Convent	1	30,000
Hotel	1	400,000
Sheds	3	700
School	1	225,000
Dormitory	1	68,000
Auditorium and office	2	60,000
Clubhouses	2	850,000
Service station	1	110,000
Gas stations	2	2,500
Offices	7	97,000
Office buildings	3	259,000
Printing Office	1	8,500
Moving-picture theaters	2	206,500
Theaters	3	380,000
Store and apartments	3	41,500
Store and dwellings	14	148,600
Storage plant	1	25,000
Substation	1	9,100
Workshop	1	300
Ice warehouse	1	125,000
Cow barn	1	1,000
Wagon shop	1	1,500
Store and office buildings	2	240,000
Stables	3	1,250
Transforming station	1	200
Hollow tile:		
Dwellings	6	44,400
Garages	35	36,500
Repairs	3	25,760
Studio	1	5,000
Shed	1	600
Concrete:		
Dwellings	5	$21,130
Apartment	1	35,000
Garages	32	46,240
Lunch room	1	700
Shed	1	200
Gas station	1	1,200
Warehouse	1	35,000
Ice plant	1	90,000
Store	1	1,200
Storage houses	2	1,250
Shipping room	1	5,000
Repairs	5	194,650
Sand and gravel bin	1	5,000
Metal:		
Garages	1,402	376,061
Sheds	42	150,198
Tanks	11	7,000
Warehouse	1	10,000
Repairs	1	75
Frame:		
Sheds	431	36,613
Repairs	693	21,706
Dwellings	294	1,699,920
Garages	165	41,555
Store	1	1,500
Dormitory	1	4,000
Parish Hall	1	3,000
Hay barracks	1	200
Church	1	300
Vinegar tanks	5	10,000
Barn	1	1,950
Machinery:		
Elevators	83	366,200
Motors	610	391,340
Boilers	4	1,100
Total	6,928	18,999,926
Awnings	139	19,425
Signs	1,494	14,940
Grand total	8,561	19,025,291

The following summary shows the distribution of improvements in the respective sections of the District and the values of same:

	Buildings.	Repairs, etc.
Northeast	$444,330	$133,388
Southeast	569,015	203,680
Northwest	5,578,708	2,612,344
Southwest	125,650	74,162
County	8,163,814	844,835
Total	14,881,517	4,118,409
Sum total [1]	18,999,926	

[1] Does not include awnings or signs, the values of which are estimated.

Grand total for all building operations, $19,025,291.

Comparative statement for years 1920 and 1921.

	New buildings.	Repairs, etc.	Dwellings.	Apartments.	Business buildings.
1921	1,605	5,323	772	14	819
1920	2,346	4,506	1,124	26	1,196
	[1] 741	[2] 817	[1] 352	[1] 12	[1] 377

[1] Decrease. [2] Increase.

Valuation of building operations, including awnings and signs:	
1921	$19,025,291
1920	22,659,452
Decrease	3,634,161
Permits issued, number of, including awnings and signs:	
1921	8,310
1920	7,525
Increase	785

Estimated number of buildings in the District of Columbia.

	Brick.	Tile.	Concrete.	Stone.	Frame.
1921, erected	1,209	43	48	.....	305
1921, razed	76	.....	.....	.....	148
	1,133	43	48	.....	157
1920	68,127	226	61	2	27,181
Total estimated number standing	69,260	269	109	2	27,338

The act to regulate the height, area, and use of buildings in the District of Columbia and to create a zoning commission was approved March 1, 1920, and the regulations provided for thereunder became effective August 30, following.

During the ensuing 10 months there were issued 4,150 conforming certificates of occupancy and 450 nonconforming certificates, the fees therefor totaling $2,400.

The general and commendatory acceptance of the zoning regulations, considering their revolutionary character as affecting building operations and the uses of buildings, has been quite as gratifying as noteworthy. A thoroughly satisfactory administration in this respect, however, is defeated by reason of an inadequate working force, those employees temporarily assigned to this division from other departments being frequently recalled about the time they have become familiarized with the regulations and duties relating thereto. The personnel of this office should be permanently augmented to a quota sufficient to cope smoothly and promptly with the situation.

Inspection of boilers.

Boilers inspected		474
Boilers inspected for the District of Columbia (no fees)		20
Boilers condemned as unfit for further use		4
Cases of scale and deposit		46
Cases of defective setting		20
Cases of defective steam gauges		7
Cases of defective tubes		96
Cases of defective shell plates		65
Cases of working pressure reduced		11
Total amount received	$2,380	
Total amount expended	350	
		$2,030

Very respectfully,

JOHN P. HEALY,
Inspector of Buildings.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE PERMIT CLERK, ENGINEER DEPARTMENT.

WASHINGTON, *August 29, 1921.*

SIR: I have the honor to submit the following report of the permit clerk's office, giving the number of permits issued during the fiscal year ended June 30, 1921:

Water connections	1,035
Repairs	725
Specials (no fee)	124
Sewer connections	1,056
Repairs	739
Specials (no fee)	891
Gas mains and connections	1,095
Repairs	294
Specials (no fee)	14
Electric construction, underground connections	2,078
Repairs	36
Conduits	326
Manholes	127
Automobile pipe lines and private conduits	14
Fences to inclose parkings	581
Guard stones in alleys	7
Poles—erect, replace, and move	664
Miscellaneous	22
Permits for the various kinds of work in public space	2,971
Total permits issued	12,799

Fees of $1 each were paid for 8,799 and fees for which no fees were paid 4,000.

Three thousand four hundred and sixty-three files were referred to this office, record cards made, permits issued and reports made, the files indorsed and returned to the respective divisions having supervision over the inspection for which the permits were issued.

The applications for permits were sorted and filed according to location of the work, for ready reference, written report being made of all permits for excavations in the public space to the engineer of highways.

Very respectfully,

H. M. WOODWARD, *Permit Clerk.*

To the INSPECTOR OF BUILDINGS.

REPORT OF THE BOARD OF EXAMINERS OF STEAM ENGINEERS.

WASHINGTON, D. C., *August 31, 1921.*

SIR: The board of examiners of steam engineers have the honor submit to you the report for the year ending June 30, 1921. The owing table shows the work as it progressed during each month:

	Meetings held.	Applicants received.	Applicants approved.	Applicants not competent.	First class.	Second class.	Third class.	Gas fired for pressing machines.	Special class.
1920.									
y	5	17	10	7	.....	.....	4	5	1
ust	4	17	8	9	.....	1	3	4	.....
tember	4	4	2	2	.....	.....	2	.....	.....
tober	5	17	11	6	.....	2	5	3	1
vember	4	18	6	12	.....	.....	4	2	.....
cember	5	12	4	8	.....	.....	2	2	.....
1921.									
nuary	4	19	6	13	.....	1	3	.....	2
bruary	4	8	4	4	.....	.....	1	3	.....
rch	4	11	4	7	.....	.....	3	.....	1
ril	5	19	9	10	.....	.....	4	5	.....
y	4	11	2	9	.....	.....	.....	2	.....
ne	4	15	11	4	.....	.....	2	9	.....
Total	52	168	77	91	.....	4	33	35	5

Our estimate of expenses for the year ending June, 1923, has been submitted to the secretary, Board of Commissioners. We most respectfully ask that the amounts set forth be appropriated.

Respectfully submitted.

E. F. VERMILLION,
H. BOESCH,
W. I. EVANS,
Board of Examiners of Steam Engineers.

To the INSPECTOR OF BUILDINGS.

REPORT OF INSPECTOR OF PLUMBING.

WASHINGTON, D. C., *September 1, 1921.*

SIR: I have the honor to submit the thirty-ninth annual report of the plumbing inspecting division, engineer department.

During the fiscal year there were a total of 38,379 inspections made by the field force, which averaged nine men, of which 11,714, or slightly less than one-third of the total inspection, were on complaints relative to defective plumbing or defective sheet-metal work. There were, in addition, 3,371 inspections made in connection with appeals, police court work, and District construction work, making a total of 41,750 recorded inspections. This was a very great increase over the 24,505 inspections made during the previous fiscal year. Special arrangements were made to render every assistance to the construction inspectors of the municipal architect's office, and they were undoubtedly relieved of much detail work in connection with plumbing installations. This office also assisted the municipal architect with plumbing plans and specifications when requested.

The office record shows that the plumbing work in new buildings during the year amounted to $1,370,954, and it is estimated that $1,114,000 worth of remodeling and repair work was done, making the total of plumbing work done in the District, in private buildings, about $2,500,000. Much plumbing work was also done in the District by the various agencies of the United States Government, but this office keeps no record thereof.

A substantial increase was noted in the amount of office work done in connection with inspection work and handling of plans and specifications, both for private work and for public construction work.

In our police court work there were a total number of 38 warrants obtained, all of them for either violation of the plumbing regulations or plumbing work done by unlicensed plumbers. A few of these cases were nolle prossed on compliance before the case came to trial, but one case was dismissed, and the balance being fined; a total of $448 collected therefor.

There were 181 cases referred to this office by the health office and other departments for prosecution under the nuisance and drainage acts. In a great many of these cases the required repairs were made by the agent or owner after proper representation of the facts and in only 17 cases did this office finally have to do the work and assess the cost. There are still 5 cases under notice and 12 cases are being held by reason of the fact that ownership can not be properly determined or for other legal reasons.

The plumbing board held 24 meetings and examined 77 candidates, of whom 13 passed and were recommended for license. There were on June 30, 1921, 236 registered plumbers, about 195 of whom were actively engaged in business. There were also 8 registered gas fitters.

There were in operation throughout the year four convenience stations, open from 6 a. m. until midnight, with two shifts of attendants, each working 9 hours per day. The largest station, that at Seventh Street and Pennsylvania Avenue NW., accommodated 6,622,636 persons; that at Thirteen-and-a-half Street and Pennsylvania Avenue NW., 1,669,410; that at Ninth and K Streets NW., 1,427,266; that at Fifteenth and H Streets NE., 1,120,978, making a total patronage of nearly 11,000,000, this being over 900,000 a month, and 30,000 per day, 1,600 per hour.

The women used the stations a little over one-eighth as much as the men and contributed about one-tenth of the receipts. These cash receipts for the year amounted to $8,882.17, and consisted of fees received for use of pay toilets, the rental of clean towels, commission on telephone service, weighing machines, etc., being about 45 per cent of the total cost of operation of the stations. Of the several cities exchanging records with this office some have no receipts at all by reason of the lack of any charges, and the rest average about 15 per cent of the cost of operation in receipts. I believe this showing is due to the general excellence of our stations, the service we give in our pay compartments, and the close track that is kept by means of our coin lock system.

The need for new stations is being continually pointed out and it is strongly recommended that an effort be made to enlarge the number in our business sections as soon as may be possible.

During the past year this office has lost several men by reason of inadequate salaries. and it is most earnestly recommended that unusual effort be made to obtain salaries for these technical men commensurate with their duties.

In consideration of the efficient and faithful service rendered by men in this office, I recommend them to your most earnest consideration.

A. R. McGONEGAL,
Inspector of Plumbing.

To the INSPECTOR OF BUILDINGS.

REPORT OF ASSISTANT ENGINEER COMMISSIONER WOOD.

WASHINGTON, *October 1, 1921.*

SIR: I have the honor to transmit herewith annual reports of the operations of the various divisions and offices under my immediate supervision for the fiscal year ended June 30, 1921.

Very respectfully,

JOHN ELLIOTT WOOD,
Captain, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.

To the ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT.

WASHINGTON, *September 8, 1921.*

SIR: The annual report of the water department for the fiscal year ended June 30, 1921, is submitted herewith.

The complete reports of the subdivision heads of the department are on file in the office of the superintendent.

I again invite attention to a method of preventing water waste by both the United States Government and municipal offices, and also a method of ascertaining the value of construction work of the aqueduct office, District government, and water department, which are outlined more fully in my annual report under date of October 5, 1918.

The total length of mains laid during the fiscal year ended June 30, 1921, is 8.5 miles, making the total length of mains in service 647.5 miles.

The average daily water consumption for the year is 61,506,830 gallons, making a per capita consumption of 140.5 gallons. I am glad to report that this is approximately 1,400,000 less than the mean daily consumption of the preceding year.

I again suggest that at the earliest possible date the question be taken up of the disposal of the valuable real estate in square No. 175, bounded by Sixteenth, Seventeenth, U, and V Streets NW., as this property represents an investment of $66,500, and is no longer used or needed by the water department. This sum could be used to advantage in making needed extensions of the distributing system.

I am very glad to report that some of the Government departments have taken initial steps to do away with the use of filtered water for condensing purposes, and am of the opinion that if the crusade against

the waste of water is continued and officials will cooperate with the District authorities many thousands of gallons of water can be saved. I wish to record my appreciation of the work done by the employees of this department.

J. S. GARLAND,
Superintendent Water Department.

ASSISTANT TO THE ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION.

The work of repairing the concrete cover on the Reno Reservoir was completed during the year. The top was given slightly more pitch and a couple of ventilators were added to take care of the condensation on the underside of the concrete.

A 20-inch trunk main was laid in Illinois Avenue and Georgia Avenue, from Grant Circle to Military Road. This forms one link in a proposed line which it is intended to lay to a point beyond the Walter Reed Hospital. This water main is in the third high service, and serves a very large area of the higher sections of the District.

Twelve-inch water mains were laid as follows: F Street, from Eighth to Fourteenth streets NW.; Benning Road, east from Anacosta Road NE.; Thirteenth Street, between Hamilton and Kennedy Streets NW.; and in Webster Street, between Sixteenth and Seventeenth Streets NW.

Of these, a most important was the main laid in F Street. This main passes through the center of the business district, affording increased fire protection. The old 6-inch service main was removed and all house services were connected to the 12-inch water main.

The 12-inch water main in Bladensburg Road north and south of Queen Chapel Road NE. was lowered to meet a change in the street grade.

The cost of laying water mains will be shown in tabulated statements.

STEAM ENGINEERING.

The following is a summary of the work done at the District pumping station during the year:

Water pumped, figured from plunger displacement:		
First high service	gallons	6,932,717,090
Second high service	do	3,358,905,170
Third high service	do	1,068,270,470
Total	do	11,359,892,730
Fourth high service	do	81,354,420
Coal burned	tons	7,466
Cylinder oil used	gallons	989
Engine oil used	do	2,208
Filtered oil used	do	699
Turbine oil used	do	859
Grease used	pounds	456
Waste used	do	715

The regular force employed at this station in the daily operation of the pumping engines, boilers and auxillaries, cleaning of machinery, etc., consists of three crews of three engineers in charge, three assistant engineers, three firemen, three oilers, and three cleaners, working

in eight-hour alternate shifts, six days on duty and one day off per week, being relieved on days off by an extra engineer crew.

For the fourth high service, the water is pumped from the Reno Reservoir, which is supplied by the third high-service pumps, to an elevated tank by gasoline engines and triplex pumps. This machinery is operated daily by three enginemen who work on eight-hour shifts. The water pumped for this service during the year was 81,354,420 gallons, or a mean of 222,888 gallons daily.

The Anacostia pumping station has been operated without interruption during the year, pumping to the three towers supplying the area east of the Anacostia River. This station is taken care of by four men. The water pumped for this service during the year was 146,772,060 gallons, or a mean of 402,116 gallons daily.

The total pumpage for the year at the District pumping station was 263,322,530 gallons less than for the fiscal year 1920. The greatest amount pumped in one day (June 20) was 38,451,670 gallons, the least in one day (July 18) was 28,340,710 gallons, and the average dynamic head against pumps was 117.7 feet. The total operating expense chargeable to pumping was $118,195.29, as against $107,326.98 in 1920, making the total operative cost of pumping 1,000,000 gallons of water into the mains $10.40. This is $1.17 per million gallons more than in 1920, and is entirely due to the increased cost of labor and material. The average cost of coal for the year was $9.20, which was $2.14 more than in 1920.

The station duty for the year was 68,616,116 foot-pounds per 100 pounds of coal. This is 1.2 per cent more than the duty obtained during the preceding year, and represents an annual saving of approximately 134 gross tons of coal. This saving in coal may be attributed partly to a greater proportionate amount of work performed by the high-duty pumping units, and partly to improved operating conditions.

WATER SURVEYS.

Nearly 1,000,000 gallons daily underground leakage was found and stopped by routine water surveys in the gravity service represents the principal result of the activities of the division during the year. This total compares favorably with the total found last year, 1,098,912 gallons. This slight decrease may be attributed to the smaller field force and to the increased difficulties of locating small leaks. A total of 189 individual leaks represents the conditions found during the year, as against 165 during 1920.

The average leak was 5,192 gallons per day, as compared to 6,660 gallons per day of the previous year. The principal sources of waste were corroded iron service pipes wasting 252,600 gallons, defective lead service pipes, 224,600 gallons, defective wiped joints on lead services and on iron service connections at the corporation cocks, 216,000 gallons, and defective calked joints on cast-iron mains, 152,600 gallons per day. One hundred and sixty-nine thousand nine hundred and thirty gallons per day leakage not underground but of an obscure nature was found in the automatic float controlled horse fountains located throughout the city. This waste was caused by the enlargement of the orifice due to corrosion, defective ball cocks and fittings corroded by galvanic action.

Study of Statement No. 1 forming part of this report shows the interesting fact that at least 1,000,000 gallons daily underground leakage can be found each year by the present working force of this division, regardless of what section of the city is surveyed. It is also worthy of note, shown by further study of these reports, that this leakage can be found repeatedly within the same section if a lapse of one or two years is permitted between the successive surveys. In other words, it is evident that this division is finding new leaks each year which have occurred since the previous surveys in the same section. The grand total of purely underground leakage actually located, exposed, measured and remedied since this work was started in 1907 is over 49,000,000 gallons daily. Adding this to the present daily consumption of 60,000,000 gallons gives a figure somewhat startling in the present water supply situation. It is evident that the prevention of water waste, by routine water surveys, has delayed the necessity of a new tunnel for at least 10 years.

Tables giving in full detail the routine work performed are on file in the office of the superintendant.

STORES AND ACCOUNTS.

The values of material and equipment handled during the year were as follows:

Material received, $394,546.32; issued, $418,566.70. Equipment received, $21,863.56; issued, $16,038.57.

Old material was delivered to contractor to the value of $1,736.20.

Value of material on hand at close of year was $185,943.76 and the value of equipment in stock and in service was $700,842.96.

Tabular statements submitted herewith showing financial condition of the department and cost of work done during the year.

STATEMENT No. 1.—*Underground leaks, 1907–1921.*

Year.	Number.	Quantity (gallons per day).	Average (gallons per day).
1907–8	271	5,604,400	20,700
1908–9	852	9,500,000	11,500
1909–10	532	6,364,200	12,000
1910–11	624	6,921,900	11,100
1911–12	813	5,115,300	6,300
1912–13	651	4,195,100	5,400
1913–14	452	2,552,800	5,600
1914–15	385	1,828,820	4,800
1915–16	420	1,984,600	4,700
1916–17	340	1,752,750	5,155
1917–18	178	831,640	4,689
1918–19	180	1,160,510	6,447
1919–20	165	1,098,912	6,660
1920–21	187	990,430	5,192
14 years	6,030	49,901,362	8,276

E I.—*Statement of cash account of the water fund, District of Columbia, including propriations and outstanding obligations, for the fiscal year ended June 30, 1921, shown by the books of the auditor, District of Columbia.*

ces June 30, 1920:		
Cash in Treasury of the United States	$128,314.11	
Cash on requisition to credit of disbursing officer, District of Columbia	36,338.11	
		$164,652.22
r rents	984,055.23	
and stopcocks	5,736.70	
r main assessments	76,933.41	
Interest	2,056.42	
of materials	1,557.73	
		1,070,339.49
yments and credit transfers		82,432.91
Total		1,317,424.62
enditures for the year:		
Appropriation, water department, District of Columbia, 1921—		
Salaries—		
Revenue and inspection branch	38,330.36	
Distribution branch	55,928.97	
Contingent expenses	3,676.57	
Maintenance and operation	403,927.04	
20-inch water main	69,989.20	
12-inch water main	20,000.00	
Extension of distribution system	79,066.33	
Installing water meters	16,252.57	
Installing fire and public hydrants	26,916.41	
Refunds	5,455.42	
		719,542.87
Increase of compensation, water department		81,653.47
Appropriation, water department, District of Columbia, 1920:		
Salaries, distribution branch	41.67	
Contingent expenses	729.21	
General expenses	15,532.61	
High service	73,403.47	
Refunds	9.35	
		89,716.31
Increase of compensation, water department		675.03
Appropriation, water department, District of Columbia, 1919:		
Contingent expenses	2.00	
General expenses	71.74	
High service	336.00	
		409.74
Increase of compensation, water department		2.30
Appropriation, water department, District of Columbia, 1918:		
High service		10,632.57
Total water department expenditures		902,632.29
dvances, account appropriations:		
Washington Aqueduct, District of Columbia, 1921	158,000.00	
Increase of compensation, Washington Aqueduct	18,000.00	
Washington Aqueduct, District of Columbia, 1920	9,395.08	
		185,395.08
alances June 30, 1921:		
Cash in Treasury of the United States	179,474.80	
Cash in hands collector of taxes, District of Columbia	1,935.74	
Cash on requisition to credit of disbursing officer, District of Columbia	47,986.71	
		229,397.25
Total		1,317,424.62

Balance in water fund as stated above		$229, 3
Less obligations against appropriations:		
Water department, District of Columbia, 1921—		
Contingent expenses	$968. 81	
Maintenance and operation	22, 872. 52	
Installing water meters	1, 541. 86	
Extension distribution system	153. 15	
Installing fire and public hydrants	13, 022. 00	
Water department, District of Columbia, 1920—		
Contingent expenses	4. 70	
General expenses	51. 53	
High service	2, 888. 86	
		41, 5
Unobligated balance, water fund, June 30, 1921		187, 8

TABLE II.—*Cost of work done by the water department for the year ended June 30,*

Heads of expenditure.	Per diem and salaries.	Material expended, cuts, transportation, etc.	Total expenditure.	Charged to general account.		3
				Maintenance.	Extensions.	
Water surveys (detection of leaks)	$25, 035. 49	$4, 256. 98	$29, 292. 47	$29, 292. 47		
Maintenance of meters	18, 516. 63	13, 248. 52	31, 765. 15	31, 765. 15		
Installation of meters	5, 983. 05	10, 848. 48	16, 831. 53		$16, 831. 53	
Office of water registrar	65, 385. 27	4, 749. 85	70, 135. 12	70, 135. 12		
Inspection and repair of services	27, 417. 72	6, 721. 26	34, 138. 98	34, 138. 98		
Tapping water mains	3, 557. 36	3, 791. 36	7, 348. 72		7, 348. 72	
New service installed	679. 40	587. 53	1, 266. 93		1, 266. 93	
Engineering (field surveys)	20, 330. 42	1, 364. 73	21, 695. 15		21, 695. 15	
Stable account	11, 293. 09	5, 165. 96	16, 459. 05			$16,
Operation and repair of valves, fire hydrants, etc	23, 153. 97	4, 537. 63	27, 691. 60	27, 691. 60		
Installation of fire and public hydrants	5, 042. 90	13, 639. 36	18, 682. 26		18, 682. 26	
Water mains laid	44, 796. 69	145, 375. 25	190, 171. 94		190, 171. 94	
Repairs to leaks	19, 065. 89	7, 361. 29	26, 427. 18	26, 427. 18		
Maintenance of reservoirs, lodges, and towers	6, 899. 85	3, 241. 21	10, 141. 06	10, 141. 06		
Care of grounds	6, 763. 04	174. 24	6, 937. 28	6, 937. 28		
Repayment and deposit work	15, 600. 57	20, 491. 16	36, 091. 73			36,
Replacement work, lowering mains, etc	6, 375. 24	12, 860. 05	19, 235. 29	19, 235. 29		
Plans, estimates and tests	13, 664. 04	229. 92	13, 893. 96	9, 110. 27	4, 783. 69	
Care of Bryant Street pumping station	21, 665. 15	4, 416. 90	26, 082. 05	26, 082. 05		
Operation and repair, pumps, Bryant Street station	43, 547. 65	87, 254. 97	130, 802. 62	130, 802. 62		
Operation and repair, pumps, Reno station	4, 545. 19	1, 972. 98	6, 518. 17	6, 518. 17		
Operation and repair, pumps, Anacostia station	6, 977. 15	3, 637. 63	10, 614. 78	10, 614. 78		
Shopwork	25, 240. 22	28, 112. 48	53, 352. 70	53, 352. 70		
Furnished other District of Columbia offices	4, 357. 21	105. 62	4, 462. 83	4, 462. 83		
Gross expenditures	425, 893. 19	384, 145. 36	810, 038. 55	496, 707. 55	260, 780. 22	52,

SUMMARY.

Expenditures:		Charged to:		Pe
Per diem pay rolls	$331, 828. 60	Maintenance	$496, 707. 55	
Salary pay rolls	94, 064. 59	Extensions	260, 780. 22	
Total services	425, 893. 19			
Material expended, cuts, etc	384, 145. 36			
Gross expenditures	810, 038. 55			
Less transportation and repayment credits	52, 550. 78			
Net expenditure	757, 487. 77		757, 487. 77	

II.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work.*

Diameter.	In service June 30, 1920.	Laid during year ended June 30, 1921.	Abandoned during year ended June 30, 1921.	In service June 30, 1921.
.....linear feet..	83,751	997	.....	84,748
.....do....	155,708	354	1,095	154,967
.....do....	1,467,732	859	1,981	1,466,610
.....do....	918,179	26,950	132	944,997
.....do....	9,107	.....	.....	9,107
.....do....	401,344	8,994	.....	410,338
.....do....	26,018	.....	.....	26,018
.....do....	114,064	5,666	.....	119,730
.....do....	34,766	1,359	.....	36,125
.....do....	58,000	.....	.....	58,000
.....do....	59,433	.....	.....	59,433
.....do....	23	.....	.....	23
.....do....	44,172	.....	.....	44,172
.....do....	600	.....	.....	600
tal.....	3,372,897	45,179	3,208	3,414,868
res.....	11,004	216	67	11,153
rants.....	3,649	157	76	3,730
ydrants.....	232	19	13	238
fountains.....	17	.....	.....	17
intains.....	157	1	4	154
ells.....	44	.....	.....	44

IV.—*Statement of the length and cost of water mains laid from July 1, 1878, to June 30, 1921, paid from water department funds.*

Diameter.	In service June 30, 1920.	Laid during year ended June 30, 1921.	Abandoned during year ended June 30, 1921.	In service June 30, 1921.
.....linear feet..	76,822	337	.....	77,159
.....do....	117,484	.....	1,095	116,389
.....do....	1,079,532	286	1,981	1,077,737
.....do....	858,932	26,742	132	885,542
.....do....	6,739	.....	.....	6,739
.....do....	352,079	8,807	.....	360,886
.....do....	18,870	.....	.....	18,870
.....do....	102,970	5,666	.....	108,636
.....do....	14,494	1,359	.....	15,653
.....do....	20,437	.....	.....	20,437
.....do....	38,244	.....	.....	38,244
.....do....	23	.....	.....	23
.....do....	14,309	.....	.....	14,309
otal.....	2,700,935	43,197	3,208	2,740,924

st to June 30, 1920.....	$4,139,194.16
st for year ended June 30, 1921.....	190,171.94
ggregate cost to June 30, 1921.....	4,329,366.10

REPORT OF THE WATER REGISTRAR.

WASHINGTON, *September 1, 1921.*

:: I submit herewith the annual report of the revenue and inspec-
branch of the water department, showing in detail the work
nplished during the year ended June 30, 1921.

INSTALLATION OF WATER METERS.

e increased cost of meters, labor, and material, as well as the
ity of labor, precluded the possibility of extensive metering

during the year, and the work of installation consisted only of metering the services of some of the new houses in those sections which had been previously metered. The number of meters installed during the year was 974 and the number discontinued was 60, making the total now in use 62,279.

LEAKS AND WASTES.

During the year 14,475 examinations for leaks were made. This included ordinary leaks at house fixtures and the more complicated cases of underground leaks, the detection of which required considerable time and the employment of experienced men, and very fortunately the office was able to maintain a force qualified for the purpose through the most trying times that have yet been experienced.

In all 250 water services were discontinued at the tap in the main. The water supply was cut off from 200 houses this year during the period of vacancy, which has prevented the reoccupying of the houses without the knowledge of the office, thus preventing a loss of revenue.

SERVICE CONNECTIONS.

There were 1,101 new service connections made, inspected, and locations recorded during the year; also, 711 repairs, etc., to water services and appurtenances were inspected and recorded.

This work was handled by the regular inspector with some assistance from the office force, and inspections have been made in the majority of cases within one hour of the time specified by the plumber doing the work.

Owing to the reduction in the number of new service connections the tapper has been used in connection with leaks and wastes and the taking out and replacing of meters, thus keeping these branches of the work up to date. This detail did not occasion any loss of time in connection with the tapping of water mains, and saved the employment of more men in the subdivision to which the assistance was given.

REVENUES.

The table of comparative revenues shows a total collection of $1,142,525.79.

Table 1 shows statement of collections and expenditures.

Table 2 shows comparative statement of revenues.

Table 3 shows general information.

INCREASE OF WATER RATES.

Under the act of Congress approved June 5, 1920, the water rates were increased 25 per cent to take effect July 1, 1920.

According to the new schedule, on all tenements two stories high with a frontage of 16 feet or less, $6.25 per annum; for each additional front foot, or fraction thereof greater than one-half, 39 cents. For each additional story or part thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume of business, and water facilities, and rate from $1 to $25. If the flat rate

business establishments reaches $25 or more, the owner or occupant required to install a water meter at his own expense.

A minimum rate of $5.65 will be charged against all consumers supplied with water through meters, which allows the use of 7,500 cubic feet of water during the year; water used in excess thereof will be charged for at the rate of 5 cents per 100 cubic feet.

CONDITION OF THE WORK.

Notwithstanding the fact that there has been a large increase in business over that of previous years, owing to the growth of the population, the condition was met without any addition to the force and the work was up to date at the close of the year.

This result was obtained by the faithful cooperation of the employees, for which I now take pleasure in expressing my appreciation.

GEO. W. WALLACE,
Water Registrar.

The SUPERINTENDENT, WATER DEPARTMENT.

TABLE 1.—*Statement of collections.*

Water rents:	
Flat rate	$109,840.95
Meters	870,924.79
Building purposes	3,289.49
Total	984,055.23
Water-main tax, principal and interest	78,989.83
Taps and stopcocks	5,734.70
Miscellaneous receipts	1,557.73
Total	86,282.26
Total receipts	1,070,337.49
Repayments, deposits, etc	72,188.30
Total receipts and repayments	1,142,525.79

TABLE 2.—*Statement of cash receipts and expenditures of the water fund, District of Columbia, for the fiscal years from June 30, 1912, to June 30, 1921.*

Year.	Water rents.	Water-main tax, principal and interest on same.	Taps and stopcocks.	Miscellaneous receipts.	Repayments, deposits, etc.	Total receipts and repayments.
1912	$545,405.47	$122,458.81	$11,438.65	$2,817.50	$110,441.39	$792,561.82
1913	640,008.64	138,693.57	8,685.50	3,153.81	14,923.91	805,465.43
1914	646,296.15	86,379.21	6,118.20	4,253.20	24,131.64	767,178.40
1915	638,861.89	66,107.56	6,559.89	3,532.77	14,513.50	729,575.61
1916	624,882.18	64,647.80	7,020.80	1,761.39	24,669.76	722,981.93
1917	636,664.31	61,990.43	5,484.62	2,019.58	25,551.56	731,710.50
1918	714,388.28	34,649.46	3,705.65	458.96	44,391.59	797,593.94
1919	782,159.36	28,179.43	4,810.28	1,482.58	109,837.37	926,469.02
1920	771,161.55	43,121.19	6,906.47	1,164.01	32,272.23	854,625.45
1921	984,055.23	78,989.83	5,734.70	1,557.73	72,188.30	1,142,525.79
Total	6,983,883.06	725,217.29	66,464.76	22,201.53	472,921.25	8,270,687.89
1922 [1]	969,000.00	60,000.00	7,000.00	1,000.00	.....	[2] 1,037,000.00
1923 [1]	960,000.00	60,000.00	6,000.00	1,000.00	.....	[2] 1,027,000.00

[1] Estimated. [2] Estimated total revenue.

TABLE 3.—*General information.*

Average cost of installing a water meter by the department:	
Meter	[illegible]
Material	[illegible]
Labor	[illegible]
Total	[illegible]
Cost of labor and material for maintenance of meters	[illegible]
Average cost per meter for maintenance	[illegible]
Consumption of water through meters:	Cubic feet.
District meters	[illegible]
District meters in municipal buildings	[illegible]
Private meters	[illegible]
Private meters in charitable institutions	[illegible]
Total	[illegible]

Meters in service.	In use June 30, 1920.	Installed, 1921.	Abandoned, 1921.	Total in use June 30, 1921.
District meters	58,088	955	53	[illegible]
District meters in municipal buildings	264			[illegible]
Private meters	2,825	17	5	[illegible]
Private meters in charitable institutions	188	2	2	[illegible]
Total	61,365	974	60	62,279

Average cost of reading meters			[illegible]
Average cost of computing and making bills			[illegible]
Average payment for premises in which meters were installed			[illegible]
Average payment for flat-rate accounts			[illegible]
Difference			[illegible]
Premises which receive an allowance of free water:			
Number of institutions			[illegible]
Number of meters			[illegible]
Cubic feet of water consumed			[illegible]
Allowance of free water, cubic feet			[illegible]
Number of institutions exceeding allowance			[illegible]
Revenue:			
For metered water—			
District of Columbia meters		$479,049.50	
Private meters		391,875.29	
			$870,924.79
For flat-rate accounts—			
Water rents		109,840.95	
Building purposes		3,289.49	
			113,130.44
Total revenue for fiscal year 1921			984,055.23
Water services:			
In use June 30, 1920			72,149
Installed, 1921			4,101
Total			73,250
Abandoned, 1921			352
In use June 30, 1921			72,898
Metered			62,279
Difference			10,619
Percentage of services metered			85

REPORT OF THE SANITARY ENGINEER.

WASHINGTON, D. C., *August 9, 1921.*

SIR: In submitting this my fourteenth and last annual report, covering the fiscal year ending June 30, 1921, it is considered important to direct your attention to need of continuing the work on the construction of the upper Potomac and the main Anacostia intercepting sewers, items for which were included in the estimates recently submitted for the next fiscal year. In the last annual report this need was unavailingly set forth at some length. Within

w years funds will be required for beginning the sewage-treatment ks, and logically these interceptors should first be completed. ie demands for economy require a reduction of the very moderate is just submitted for all classes of sewerage works it would appear be the part of wisdom not to entirely eliminate either of these ortant items, but to allow a smaller sum for each, even though ere necessary to reduce by a corresponding amount the allowance main and pipe, suburban, and assessment and permit sewers.

n accordance with the demand for extreme economy in space, to e expenditure for printing, the briefest possible record will be le of the year's activities.

TION A. ENGINEERING DATA, DESIGNS, AND DRAINAGE STUDIES.

'he data for the year were much curtailed by lack of funds and sonnel. Bacteriological examination of park streams and oxygen s of river waters, both indicate the effect of increasing pollution. 'he river flow, which measures the capacity for the present sewage posal by dilution, fell below 2,000 second-feet for 2 days, below)0 second-feet for 6 days, below 2,400 second-feet for 15 days, h a minimum flow of 1,850, a maximum flow of 58,500, and a in for the year of 9,150 second-feet.

Rainfall data were continuously recorded for the year at 4 autotic and 21 pot gauges. There were no storms of extraordinary ensity.

Studies were made for a number of new drainage projects.

'he Rock Creek pumping station was completed, including the chanical installation, and began the delivery to the disposal sys- 1 of the sanitary drainage of the upper Potomac on June 15, 1921.

ECTION B. OPERATION AND MAINTENANCE, SEWERAGE SYSTEM.

)perating activities for the year included the inspection of the erior of 149.29 miles of trunk sewers and the inspection of 1,047.3 es of pipe sewers. It included also the cleaning of 31.7 miles of ers at a cost of $7,383.80; the flushing of about 1,000 miles of e sewers at a cost of $4,062.51; the cleaning of 29,354 city stormter catchment basins and removing 4,850 tons of silt therefrom a cost of $22,470.86; and the cleaning of 5,895 suburban stormter catchment basins and the removal of 3,760 cubic yards of silt refrom at a cost of $6,159.80. Chargeable to mosquito preven- 1 22,981 storm-water catchment basins were specially flushed and ated with mosquito oil during the summer months at a cost of 064.50. The maintenance work for the year included the making all immediately necessary repairs throughout the trunk sewer tem as rapidly as reported from the inspection force engaged in examination of the interior of the 149 miles of trunk sewers. a number of cases, however, repairs were of little value on account the fact that the very old trunk sewers, built 50 to 75 years ago, brick laid in lime mortar are beyond the stage of repairing and uld be reconstructed. Expenditure on work of this character is vaste of public funds that may be expressed as the extortionate e of interest on the capital necessary to install new and modern uctures that for many years would require no expenditure for

maintenance. All necessary repairs throughout the system were made on the pipe sewers. The record of cost of all work performed, including comparative costs with preceding years, together with an accurate daily statement of work performed, is maintained on the card system.

SECTION C. OPERATION AND MAINTENANCE, SEWAGE-DISPOSAL SYSTEM, PUMPING STATIONS, SHOPS, AND YARDS.

The main sewerage pumping station and the Poplar Point and Woodridge pumping stations were in continuous operation throughout the year, and the Rock Creek pumping station, which cares for the sanitary drainage from the upper Potomac areas, was placed in service June 15, 1921. The main station handled 25,000,000,000 gallons of sewage and 424,000,000 gallons of storm water. The Poplar Point station handled 832,000,000 gallons of sewage and the Woodridge station 17,000,000 gallons of sewage during the year. The steam plant at the main sewerage pumping station was substantially reconstructed during the year and improved in efficiency by modernizing the automatic stokers which had been in continuous service without appreciable repairs during 12 years. Repairs and necessary construction work was handled by the blacksmith, machine, and carpenter shops, including a very large part of the installation of the new Rock Creek pumping station.

SECTION D. CONSTRUCTION.

During the year 1.55 miles of main sewers and 6.02 miles of pipe sewers were constructed, about 25 per cent within the old city limits and the balance in suburban areas.

Sewage-disposal system construction was limited to upper Potomac interceptor, which was completed to a point just beyond the Aqueduct Bridge at Thirty-sixth Street, Georgetown.

SECTION E. MAPS, RECORDS, AND DRAFTING.

Work was continued on the 10 feet to 1 inch standard record maps of subsurface surveys and on the 50 feet to 1 inch scale maps showing the sewerage.

A number of detailed drawings for new installations and structures were prepared, maps and records kept carefully posted to date, and the usual plats for extensions, assessments and for contracts prepared.

SECTION F. RECORDS AND ACCOUNTS.

The work of this division covered the preparation of requisitions, detail costs of construction, pay rolls and vouchers, cost-keeping studies and material and equipment accounting, covering the following expenditures from the several appropriations:

SEWERAGE SYSTEM.

Cleaning and repairing	$94,867.89
Sewage pumping service	107,979.56
Main and pipe	99,685.04
Suburban	163,623.90

sessment and permit	$60,584.53
rmit work	821.71
iscellaneous trust fund deposits	5,137.95
iscellaneous appropriations	20,199.02
ndemnation	328.95
utstanding contracts:	
Suburban	36,376.10
Assessment and permit	9,415.47
Total	629,020.12

SEWAGE-DISPOSAL SYSTEM.

pper Potomac interceptor, 1920	$22,001.08
pper Potomac interceptor, 1921	29,376.17
Total	51,377.25
Total expenditures	680,397.37

SECTION G. PUBLIC SERVICE CORPORATIONS.

Work of this division involves detailed determination of proper ocation of all underground construction by the gas, electric, telephone, and telegraph companies and the methodic supervision of the work done under the permits issued therefor, the accurate location of all work and its recording and mapping. The economic and orderly occupation of the public space along predetermined systematic lines is the feature of this work. The work for the year may be summarized as follows:

Permits prepared		2,176
New record cards		2,176
New jobs inspected and recorded on sheet		1,843
Daily average jobs under construction		38
New gas mains laid	miles	4.78
Electric duct laid	do	89.41
Manholes constructed		1,752
Drains from manholes and railroad tracks		59
Houses connected with gas mains		446
Houses connected for electric light and power		2,365
Permit for gasoline and compressed-air pipes		10
Vault applications approved		11
Vaults inspected, located, and recorded		14
Water department connections to sewerage system		93

Fourteen standard record maps, 50 feet to 1 inch, were made, five for gas mains, and nine for electric conduits.

The cost to the public service corporations for this work, prorated on the basis of the volume of construction was as follows:

Potomac Electric Power Co.	$2,628.44
Chesapeake & Potomac Telephone Co.	806.92
Washington Gas Light Co.	355.07
Georgetown Gas Light Co.	124.83
Washington Railway & Electric Co.	4.00
Capital Traction Co.	70.48
Total	3,989.74

The following is a summary of the sewerage system and sewage-disposal system to June 30, 1921:

Length of sewerage system ..... miles..	753.[illegible]
Main sewers, 150.84 miles; pipe sewers, 603.04 miles.	
Length of sewage-disposal system ..... miles..	38.[illegible]
Total length ..... miles..	791.[illegible]
Cost of sewerage system	$15,101,797.[illegible]
Cost of sewage-disposal system	5,970,347.[illegible]
Total cost	21,072,141.[illegible]

ASA E. PHILLIPS,
Sanitary Engineer.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, D. C., *September 13, 1921.*

SIR: I have the honor to submit the following report of the operations of the electrical department for the fiscal year ended June 30, 1921.

STREET LIGHTING.

The street lighting system has again been little more than barely maintained, there having again been no increase in appropriation. Maintenance difficulties have been somewhat ameliorated and the condition maintenance of the service, particularly as to the gas lighting, has been distinctly improved.

Additions and extensions have necessarily been confined to some of the more pressing demands and needs, in newly occupied unlighted streets, in streets and alleys of enlarged occupancy, and at special points urgently requiring additional safeguarding of traffic. The improvements noted below in Connecticut Avenue and in Massachusetts Avenue were incident to such traffic needs at the intersection of Connecticut Avenue and Calvert Street, and at Sheridan Circle, respectively; those at New Hampshire Avenue and at Louisiana Avenue were incident to new pavement and street improvement work.

The net increase in number of lamps of all kinds is 342, less than 1¾ per cent. Of the 533 lamps newly connected (gross), 322, or more than 60 per cent, were either "designation" lamps or the lowest-powered gas or electric. The increase in aggregate candle-power of the street lighting system is from approximately 1,682,350 to approximately 1,707,200, or less than 1.5 per cent, about one-half the annual rate of increment of the population of Washington, based on the 1910 and 1920 United States census, indicating that the lighting of the city, already "on too low a plane," is progressively not improving. Rather than a lengthy discussion of the situation and needs, reference is made to report of 1920, which continues to apply except that the increase of appropriation for the current year, just over 3½ per cent, gives hope of perhaps more than checking the retrogression.

The replacement of many of the street designation signs by other of greater legibility, heretofore referred to, has progressed well, the

titution being practically complete as to electric lamps and well in as to the gas.

ARC LIGHTING.

his system has been affected only by the discontinuance of five apere magnetite arc lamps, in connection with the improvement ouisiana Avenue, Ninth to Tenth Streets NW. The total num- of arc lamps connected June 30, 1921, was 779, as compared with at the close of the preceding year.

INCANDESCENT ELECTRIC LIGHTING.

he number of incandescent electric lamps added is 367, discon- ued 86, a net increase of 281. Of these, 94 were of 60 candle- ver, in alleys and suburban highways, 13 of 100 candlepower, on rhead wires in suburban highways, 170 of 100 candlepower on District of Columbia standard design of ornamental posts, and f 250 candlepower on similar posts. The considerable installa- is of lamps on ornamental posts are 39 on Calvert Street and on nnecticut Avenue NW., from Calvert Street Bridge to Cathedral enue; 32 on New Hampshire Avenue NW., Twenty-seventh eet to Washington Circle; 61 on Massachusetts Avenue NW., pont Circle to S Street, including Sheridan Circle; 29 on Louisiana enue NW., Eighth to Tenth Streets.

The total number of incandescent electric lamps connected June 1921, was 8,406, compared with 8,125 at the close of the preceding ar.

MANTLE GAS LIGHTING.

The number of mantle gas lamps added was 123; discontinued 98; net increase of 25, in single lamps and small groups. The 98 scontinued were replaced by 90 of the 100-candlepower electric candescent. The total mantle gas lamps connected June 30, 1921, is 10,581, compared with 10,556 at the close of the preceding year.

DESIGNATION LAMPS.

The number of designation lamps added was 43, 35 electric and 8 is, and the number discontinued was 2 gas, a net increase of 41; e 2 gas discontinued were replaced by 2 of the electric. The total designation lamps connected June 30, 1921, was 576 (397 gas, 179 ectric), compared with 535 (391 gas, 144 electric) at the close of e preceding year.

LIGHTING ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the istrict of Columbia against certain railroad companies for repay- ent for sums expended for the lighting of streets, avenues, etc., ljacent to their several rights of way, remains essentially as reported year ago. The new trial in the lower court, necessitated by the ling of the court of appeals, referred to, has not been reached.

SIGNAL SYSTEMS.

The fire-alarm telegraph, police-patrol signal, and the telephone systems have been operated and maintained and each has expanded slightly in the line of natural growth.

Fire-alarm boxes added to the system numbered 22 (20 public and 2 "private"), and 3 "private" boxes were discontinued, a net increase of 19, to a total in service June 30, 1921, of 714. Boxes connected by underground wires were increased by 18 to a total of 613, including 482 on street posts, and boxes connected by overhead wires increased by 1 to a total of 101.

The recommendation of increase in appropriation for a term of years to meet the substandard condition of number of boxes connected for the area covered, a subject of criticism by National Fire Protection Association in its periodical reports on survey of cities, is repeated.

The number of fire alarms received and transmitted through fire-alarm headquarters was 1,795, compared with 1,815 in 1920 and 2,248 in 1919; this includes 21 "additional" alarms (second and third), compared with 22 (second, third, and fourth) in the preceding year. False alarms numbered 145, compared with 151 in preceding year.

The apparatus under contract for expansion of equipment in fire-alarm headquarters had not been received at the close of the year.

The number of police patrol boxes added was 12 (6 connected underground and 6 overhead) and 1 box was discontinued, a net increase of 11, compared with 4 in the preceding year, bringing the total connected June 30, 1921, to 475; of these 378 are connected on underground wires and 97 on overhead.

The number of telephones added on the two switchboards in the jurisdiction of this department was 25 and 16 were discontinued, a net increase of 9, compared with 19 for the preceding year. The total of telephones on District of Columbia system was increased by 36 (compared with 34 of the preceding year) to a total connected June 30, 1921, of 1,427.

The number of cells of storage battery connected on fire-alarm, police-patrol, and local circuits remains unchanged, at 2,174.

The distribution equipment for the composite signal systems (fire alarm, police patrol, and telephone) has been affected by a net increase in underground wires of 1.56 miles of cable, 33.33 miles of conductor, while the overhead wires remain unchanged. Grand total of composite distribution, 6,549 miles of conductor. Certain of the trunk lines are overloaded and appropriation for expansion is urgently required.

POLES AND OVERHEAD WIRES.

The regulation of the erection of poles and the stringing of overhead wires in the streets and other public spaces within the control of the Commissioners has been carried on under the various laws relating thereto and regulations thereunder. The operations of the public utility companies have resulted in an aggregate net increase during the year of 348 poles (289 line and 59 guy), bringing the record total of all electric poles on June 30, 1921, to 20,004 (18,889 line and 1,115 guy). The number of telephone poles in streets and avenues with

"the prescribed area" of the act of Congress regulating the e of telephone wires in the District of Columbia approved June 30, 02, has been increased during the year by 1, compared with a crease of 7 in the preceding year.

With the growing extension of high-tension supply lines and the tural tendency to limit construction costs in the face of high ices of pole line material, an increase of personnel engaged in pection on this work is imperative.

ELECTRIC WIRES AND APPARATUS.

In the operations under the act of Congress to regulate electrical iring in the District of Columbia, approved April 26, 1904, and the gulations thereunder:

The total of permits issued for installation of wires and apparatus n private property was 6,217, compared with 6,099 in the preceding ear.

Fees paid the collector of taxes, $11,626, compared with $10,596.

Number of inspections recorded, 16,170, compared with 14,965.

These figures show increase above the preceding year, which latter howed phenomenal increases over the next preceding year. Reference is made to the comments in this connection in 1920 report and he statements and recommendations therein repeated.

MISCELLANEOUS WORK.

The service of this department, in cooperation with the municipal rchitect or for other District departments or divisions, in consulting nd counseling, in preparing plans and specifications for and in upervision of electric work, has been considerable, compared with he preceding year. The major subjects were one pumping station, ne library, one correctional institution, one hospital, and seven chools.

A representative of this department, jointly with a representative f the serving company, takes monthly readings of all electric meters n municipal service and certifies the vouchers rendered, incidentally hecking to insure that service is being rendered under most advanageous schedule available; similarly vouchers for all municipal telephone service are checked for correctness of equipment charges.

PERSONNEL.

My acknowledgment of appreciation is due to the employees of this lepartment for the work accomplished by this office during the year.

Lamps of all kinds in service June 30, 1921, as compared with June 30, 1920.

Kind of lamp.	1920	1921
antle gas	10,556	10,581
lectric arc:		
6.6-ampere magnetite	282	282
4-ampere magnetite	502	197
lectric incandescent:		
250-candlepower, series	10	14
200-candlepower, multiple	64	64
100-candlepower, series	3,839	4,044
100-candlepower, multiple	120	98
Electric incandescent—Con.		
60-candlepower, series	3,773	3,917
60-candlepower, multiple	319	269
Street designation:		
Gas	391	397
Electric	144	179
Total	20,000	20,342

Net increase during year, 342 lamps.

Fire alarms received and transmitted:

Regular box alarms	[illegible]
Alarms received from telephone stations	[illegible]
Local alarms	[illegible]
Second alarms	[illegible]
Third alarms	[illegible]
Fourth alarms	[illegible]
Fifth alarms	[illegible]
Sixth alarms	[illegible]
Total	1 [illegible]
False box alarms	[illegible]
False local alarms	[illegible]

Distribution of police patrol boxes June 30, 1921.

Precinct.	Wall boxes.		Booths.	Tw
	Underground.	Overhead.		
First	38			
Second	27			
Third	50			
Fourth	37	2		
Fifth	44	2		
Sixth	29			
Seventh	23	3		
Eighth	28			
Ninth	38	21		
Tenth	51	11	1	
Eleventh	3	34	1	
Subprecinct, Tennallytown	10	21	1	
Total	[1] 378	94	3	

[1] Nine of these boxes at following locations are not on posts: 3, Union Station; 1, engineer stables, and Canal Streets; 1, Takoma Park, watch-box; 1, Treasury Department; 1, Agricultural Departa 1, Department of Justice; 1, Pan-American Union Building.

Number of telephones connected to the District system June 30, 1921.

Offices of the District Building	[illegible]
Outside offices and institutions	[illegible]
Residences	[illegible]
Public schools	[illegible]
Fire department, private branch exchange	[illegible]
Police department, private branch exchange	[illegible]
Water department, private branch exchange	[illegible]
Franklin School, private branch exchange	[illegible]
Western High School, private branch exchange	[illegible]
McKinley Manual Training School, private branch exchange	[illegible]
James Ormond Wilson Normal School, private branch exchange	[illegible]
Minor Normal School, private branch exchange	[illegible]
New Central High School, private branch exchange	[illegible]
Dunbar High School, private branch exchange	[illegible]
Public Library, private branch exchange	[illegible]
Washington Asylum and Jail, private branch exchange	[illegible]
Sewage pumping station, private branch exchange	[illegible]
District repair shop, private branch exchange	[illegible]
House of detention, private branch exchange	[illegible]
Public patrol service	[illegible]
Total	1 [illegible]

There are also 27 portable telephone sets in service, used by fire department and the electrical department.

Electrical wiring inspections.

ices received from the inspector of buildings of permits indicating electric iring:

Building	804
Machinery	334
Signs	59
Total	1,197

mits issued by the electrical department for installations:

Without fee (ordered by District of Columbia, etc.)	94
Covered by building permits	1,083
Not covered by building permits	4,928
For temporary work	78
Quarterly (maintenance of plants, etc.)	34
	6,217
Temporary use of current	453
Total	6,670

rtificates issued:

Final (including 7 without fee)	4,716

	No.	Approximate kilowatts.
amps and apparatus installed:		
Lamps, incandescent	110,148	5,507
Lamps, arc	18	35
Motors	535	977
Devices, miscellaneous	271	414
Blank outlets	160	
Subtotal	111,132	6,933
enerators	3	375
ransformers	16	339
Total	111,151	7,647

efective wiring discovered and reported by inspectors, extra of routine inspection work	528
umber of notices of defective wiring sent	1,617
equests for inspection (not related to work already under permit)	43
iscellaneous jackets (specifications, etc., for District of Columbia work, etc.)	197
otices received from the superintendent of licenses, leading to original inspection or periodic (annual) reinspection of theaters, hotels, assembly halls, etc	170

ork of inspectors of electric wiring from June 30, 1920, to June 30, 1921:

Inspections in private buildings (not including theaters and moving-picture theaters)	15,309
Inspections in municipal buildings	208
Inspections in United States Government buildings	3
Inspections in theaters (including moving-picture theaters), including reinspections, periodic (annual) and occasional of moving-picture theaters (more frequent periodic inspections being made by the fire marshal), and periodic reinspections (weekly or more frequently if bill changes) of theaters	650
Total	16,170

ees paid to the collector of taxes:

For permits	$11,626

MISCELLANEOUS WORK.

Completed:
- Smothers School, estimated cost of wiring.
- Deanwood School, specifications for electric lighting fixtures.
- Sewage pumping station, Twenty-seventh and K Streets NW., plans and s fications for lighting and power wiring.
- Public Library, K Street between Seventh and Ninth Streets NW., plan specifications for additional lighting, wiring, and fixtures.

Under construction:
- Workhouse, Occoquan, Va., specifications for generator, switchboard, an cessories.
- Woodridge Langdon School, plans and specifications for lighting, power, telephone wiring.
- Burrville School, plans and specifications for lighting, power, and tele wiring.
- West School addition, plans and specifications for lighting, power, and tele wiring.
- H. D. Cooke School addition, plans and specifications for lighting, power telephone wiring.
- Psycopathic group, Gallinger Hospital, plans and specifications for ligh power, and telephone wiring.

In preparation:
- New Eastern High School, plans and specifications for lighting, heating, p and telephone wiring and clock and bell system.

REPORT OF THE WHARF COMMITTEE.

WASHINGTON, *July 15, 192*

SIR: The wharf committee has the honor to submit the follo report for the fiscal year ended June 30, 1921:

A list of wharf property under lease on June 30, 1921, and a li wharf property used for Municipal and Federal purposes is file this office. All leases that expired during the fiscal year, with exception of the lease of J. Maury Dove Co., were renewed.

Wharf rentals are fixed by the Commissioners upon the advice o assessor as to the valuation of the wharf property.

The greatest amount of wharf property lies along the Washin Channel of the Potomac River. The total frontage on the city of the channel is 9,275 linear feet, of which slightly over one-ha under Federal jurisdiction, and the balance, i. e., the frontage betw the south curb line of N Street and Thirteenth Street west, is u the control of the Commissioners of the District of Columbia. frontage between Thirteenth and Fourteenth Streets is the sit the proposed central heating, lighting, and power plant intende supply light, heat, and power to governmental buildings. Const tion on the plant has not yet been started.

That part of the water front under the control of the Commissio is occupied by the municipal fish market and wharves, the Distric Columbia morgue, harbor police precinct, fire-boat wharf, and Dis of Columbia workhouse and sand wharves, wood yards, lumber ya marine railways, freight and excursion boat traffic and other c mercial uses.

The wharf property along the Georgetown Channel of the Poto River is under private control, with the exception of the foot of stre The foot of only one street is under lease.

Along the Anacostia River front the United States Navy Y occupies the frontage on the city side from Second to Eleventh Stre The sewage-pumping station and yard occupies the frontage betw

and Second Streets. The intake of the Capitol power plant is
ed at the foot of First Street. The only privately leased frontage
it between the building lines of Q Street SE., which is occupied
e Standard Oil Co.

e condition of the water front along the Washington Channel is
ttedly a disgrace to the National Capital. It is believed that
her large city in the world having comparable water facilities
uch an unsightly and impracticable water front as exists along
Vashington Channel. With the exception of the new municipal
narket, the sand and gravel wharf, the Norfolk & Washington
iboat wharf, and wharf No. 6 (now under construction), prac-
y all of the existing bulkhead walls, wharves and buildings used
mmercial purposes, were built in a haphazard manner by private
iduals or corporations with no regard whatever to uniformity.
xisting arrangement of the wharves and slips reduces to a great ex-
he spaces that would have been available had the water front been
oped systematically and in accordance with a well defined plan.
sightly structures should be removed from time to time as leases
e and objectionable uses such as coal and wood yards, lumber,
, and machinery storage discontinued. A careful inspection
recently made of all structures on Water Street between the
ington Barracks and Fourteenth Street, a report of which is on
this office. As a result of this insepction, it was found that
are some buildings which can now be removed, and steps are
taken in that direction.

any contemplated scheme of improvement of the water front,
ate frontage should be reserved for steamboat passenger and
it traffic. At present the following companies are operating
ers from wharves along the Washington Channel: Norfolk &
ington Steamboat Co. (passenger and freight traffic between
Point Comfort, Portsmouth, and Norfolk, Va., and Washington,
): the Maryland, Delaware & Virginia Railroad Co. (passenger
reight traffic between Baltimore, lower river points, and Wash-
n, D. C.): the Amusement Security Corporation (passenger and
it traffic between river points and Washington, D. C.): Wash-
n-Colonial Beach Co. (excursion traffic between Colonial Beach,
and Washington, D. C.), Mount Vernon & Marshall Hall Steam-
Co. (excursion and tourist traffic between Mount Vernon, Va.,
hall Hall, Md., and Washington, D. C.).

October, 1920, the wharf at the foot of N Street was condemned
removed without cost to the District. A fence has been con-
ted at this point to protect traffic.

portunity is here taken to call attention to the dilapidated and
htly buildings now housing the harbor police precinct and it is
stly hoped that funds may be secured to provide suitable quar-
or this police precinct as well as for the fireboat.

e wharf committee has kept careful record of the dates on which
nsurance policies expire and has taken the necessary steps to
such policies renewed.

ROLAND M. BRENNAN,
Chairman.
D. E. McCOMB,
RUSSELL DEAN,
Wharf Committee.

e ENGINEER COMMISSIONER.

REPORT OF THE BOARD FOR THE CONDEMNATION OF INSANI BUILDINGS.

WASHINGTON, D. C., *October 12, 19*

GENTLEMEN: The board for the condemnation of insanitary l ings submits the following report for the year ended June 30, 19

Number of board meetings held.....
Number of preliminary notices served.....
Number of condemnation notices served.....
Number of condemnation cards affixed to buildings.....
Number of condemnation notices served under section 16 of the Building Code
Inspections and miscellaneous visits made in connection with the service of notices, repair, and demolition of condemned buildings.....
Estimated number of people required to secure other living quarters through action of the board.....
Number of cases in court.....
Estimated number of tenants and occupants of dilapidated and insanitary buildings benefited by repairs since the creation of the board (May 1, 1906).....

The following is a summary of the results of the board's activ

DURING YEAR ENDED JUNE 30, 1921.

	Examined.	Demolished.	Repaired.	No action warranted.	Value of repairs.	F
INSANITARY BUILDINGS.						
In streets	137	43	34	38	$65,139	
In alleys	118	49	22	12	3,850	
UNSAFE BUILDINGS.						
In streets	65	41	6	5	11,100	
In alleys	15	23	2	3	600	
Total	335	156	64	58	81,689	
SINCE BOARD WAS CREATED (MAY 1, 1906.)						
Buildings in streets	3,613	1,689	1,268	480	$141,635	
Buildings in alleys	4,405	856	644	2,827	26,355	
Total	8,018	2,545	1,912	3,307	168,190	

Attention is invited to the fact that the act of September 25, relating to alley dwellings, as amended by the act of May 23, makes the use or occupation of such dwellings unlawful after expiration of one year following the date of the proclamation by President of the exchange of ratifications of the treaty of peace Germany. The item of repairs to alley dwellings in the preceding mary consisted mainly of conversion of such dwellings into gar Such conversion has generally increased the rental value while, a same time, it bettered living conditions. The figures on demol and repair (generally conversion) of alley dwellings indicate pl the effect of the alley dwelling law.

CAREY H. BROWN,
Major, Corps of Engineers, U. S. Army,
Assistant to Engineer Commissioner,
W. C. FOWLER, M. D.,
Health Officer, District of Columbia,
JOHN P. HEALY,
Inspector of Buildings, District of Columbia.
Board for the Condemnation of Insanitary Buildin

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

EPORT OF SUPERINTENDENT OF THE DISTRICT BUILDING.

WASHINGTON, D. C., *August 16, 1921.*

TLEMEN: I herewith submit the annual report on the care of the ct Building including the operation of the power plant, wood- and paint shops, print and blue-print shops, elevator, watch leaning forces, and the electrical department, for the fiscal year l June 30, 1921.

POWER PLANT.

ere were consumed 2,155 tons of coal which ran 15.9 per cent We again recommend that we be supplied with "New River" which will reduce our consumption approximately 200 tons per m. We have been receiving a very poor grade of coal, running 13 to 19 per cent ash; this together with the high selling price al has greatly increased the cost of operation of the power plant. e were 890 cubic yards of ashes removed at a cost of $801. total number of kilowatt-hours generated was 429,750; of this unt there were used for lighting 287,960, for operation of the eleva- 55,480, and for motors 86,310. The pneumatic-tube system was peration 2,140 hours, the heating system 4,176 hours, and the tilating system 854 hours. There were made to the mechanical ipment the following repairs: Relining and rebuilding smoke- suming arches under two 150-horsepower Sterling boilers, re- ding stokers under two 150-horsepower Sterling boilers, repairing 16 by 4 by 6 boiler feed pump which will now give service equal to t of a new one, rewinding one 5 and one 3 horsepower armatures on d-water system, spotting in slide valve on 1-horsepower Ames ine, and installation of new self-closing cocks in offices and lava- es throughout the building.

ELECTRICAL PLANT.

he electrical plant, in addition to the routine work, changed 75 ting fixtures from the direct to the semidirect, installed a new let board in the boiler room, ran a separate line from switchboard the engine room and renewed various lines. There were 1,750 of governor rope renewed on the passenger elevators at a cost of 5 and repairs to one of the field coils at a cost of $50. Electric rent used by the various departments for other than lighting was ollows:

	Kilowatt hours.
ce department	2,501
lth department	58,388
trical department	541
-alarm headquarters	32,084
Total	93,514

he high consumption of electric current by some of the depart- its makes it necessary to recommend that these particular depart- its include in their estimates an appropriation with which to ıburse the maintenance appropriation for the District Building. ing the past three years we have supplied the health department ratories with 168,405 kilowatt-hours and the fire-alarm head-

quarters with 91,117 kilowatt-hours. The elevator boards and machinery are old, which makes repair parts difficult and expensive to secure. The signal service is also old, requiring constant repairs and giving in return very poor service.

WOODWORK AND PAINT SHOP.

General repairs were made throughout the building by this department. Walls and ceilings were repainted, floors refinished, weather stripping replaced on the east and west revolving doors, window frames renewed and repainted, partition in fourth floor corridor east, extended for the corporation counsel, and numerous changes and alterations made for the convenience of the various departments.

PRINT SHOP.

This shop completed 358 orders totaling 1,379,990 pieces of printed matter at a cost of $8,101.73 for the departments of the District government; in addition to this there were numerous orders for pads, calendars, etc., executed, I believe, to the entire satisfaction of the departments.

BLUE-PRINT AND PHOTOGRAPH SHOP.

There were completed 48,582 square feet of blue printing at a cost of $2,657.45, and 1,600 photographs at a cost of $660.62. There was purchased and installed a Pease Peerless blue printer at a cost of $700 to replace one which had been in use for 13 years and which was no longer serviceable.

The District Building was completed in 1908, since which time the original departments of the District government have grown and new departments have been created. This has resulted in congestion throughout the building; corridor rooms have been built, wherever possible, to help relieve this, but many departments are handicapped because of insufficient floor space for the conduct of their business. Additional floor space should be provided either by building an addition to the District Building or the acquisition of adjacent property.

F. S. BESSON,
Major, Corps of Engrs., United States Army,
Superintendent.

The COMMISSIONERS OF THE DISTRICT OF COLUMBIA
(Through the Engineer Commissioner).

Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1922

UNDER THE DIRECTION OF
COL. CHARLES KELLER
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1922

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F. S. Besson,
Major, Corps of Engrs., United States Army,
Superintender

The Commissioners of the District of Columbia
(Through the Engineer Commissioner).

LIBRARY

Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1922

UNDER THE DIRECTION OF
COL. CHARLES KELLER
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1922

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Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1922

UNDER THE DIRECTION OF
COL. CHARLES KELLER
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1922

ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT OF COLUMBIA.

Colonel CHARLES KELLER, *Corps of Engineers, United States Army, Engineer Commissioner.*
Major F. S. BESSON, *Corps of Engineers, United States Army, Assistant.*
Major CAREY H. BROWN, *Corps of Engineers, United States Army, Assistant.*
Captain JOHN E. WOOD, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONER.

RECORD DIVISION:
ROLAND M. BRENNAN, *Chief Clerk.*
WHARF COMMITTEE:
ROLAND M. BRENNAN, *Chief Clerk, Engineer Department.*
D. E. MCCOMB, *Engineer of Bridges.*
RUSSEL DEAN, *Harbor Master.*
DISTRICT BUILDING:
Major F. S. BESSON, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR BESSON.

HIGHWAYS (STREETS, ROADS, BRIDGES, ETC.):
C. B. HUNT, *Engineer of Highways.*
J. W. DARE, *Assistant Engineer of Highways.*
Sidewalks and alleys—
H. N. MOSS, *Superintendent of Streets.*
Construction and maintenance of suburban roads—
L. R. GRABILL, *Superintendent of Suburban Roads.*
Construction and care of bridges—
D. E. MCCOMB, *Engineer of Bridges.*
Engineer Department stables—
BART. J. LYNCH, *Superintendent.*
STREET AND ALLEY CLEANING, COLLECTION OF GARBAGE, ETC.:
MORRIS HACKER, *Supervisor of City Refuse.*
T. L. COSTIGAN, *Superintendent of Street Cleaning.*
ASPHALTS AND CEMENTS:
J. O. HARGROVE, *Inspector of Asphalt and Cements.*
TREES AND PARKINGS:
CLIFFORD LANHAM, *Superintendent of Trees and Parkings.*
MUNICIPAL GARAGE:
E. P. BROOKE, *In charge.*
CHARLES N. EMMONS, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR BROWN.

MUNICIPAL ARCHITECT:
ALBERT L. HARRIS.
Repairs to municipal buildings—
HENRY STOREY, *Superintendent of Repairs.*
SURVEYOR'S OFFICE (INCLUDING STREET EXTENSIONS):
M. C. HAZEN, *Surveyor.*
BUILDING INSPECTION:
JOHN P. HEALY, *Inspector of Buildings.*
Plumbing plans and inspection—
A. R. MCGONEGAL, *Inspector of Plumbing.*
Permits, Engineer Department—
H. M. WOODWARD, *Permit Clerk.*
Plumbing board—
P. C. SCHAEFER.
J. S. O'HAGAN.
SAMUEL TAPP.
Board of examiners of steam engineers—
E. F. VERMILLION.
H. BOESCH.
W. I. EVANS.
BOARD FOR CONDEMNATION OF INSANITARY BUILDINGS:
Major CAREY H. BROWN, *Assistant to Engineer Commissioner.*
Dr. W. C. FOWLER, *Health Officer.*
JOHN P. HEALY, *Inspector of Buildings.*

UNDER THE IMMEDIATE SUPERVISION OF CAPTAIN WOOD.

WATER DEPARTMENT:
J. S. GARLAND, *Superintendent.*
Water rates—
G. W. WALLACE, *Water Registrar.*
SEWER CONSTRUCTION AND MAINTENANCE:
J. B. GORDON, *Sanitary Engineer.*
ELECTRICAL DEPARTMENT:
WARREN B. HADLEY, *Electrical Engineer.*

EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1922.

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, December 4, 1922.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats., 108), a report of the official doings of that government for the fiscal year ended June 30, 1922.

* * * * * * *

ROADWAY PAVEMENTS.

The accompanying table shows the area in square yards of new roadway pavements laid and old roadway pavements resurfaced during the year, with the totals in square yards and miles of the various kinds of pavements at the close of the fiscal year.

Comparative statement showing character and extent of roadway pavements.

	Existing amount on June 30, 1921.		New pavement laid during year, square yards.	Replaced with asphalt.	Existing amount on June 30, 1922.	
	Square yards.	Miles.			Square yards.	Miles.
Sheet asphalt and coal tar	3,377,623	179.98	44,774	.....	3,422,397	182.21
Asphalt blocks	625,673	31.74	.....	13,468	612,205	31.11
Durax block	17,968	.57	.....	.....	17,968	.57
Asphaltic or bituminous concrete:						
On concrete base	78,708	4.58	.....	.....	78,708	4.58
On broken stone base	51,088	2.68	.....	.....	51,088	2.68
Cement concrete	250,218	13.45	11,487	.....	261,705	14.07
Granite block and rubble	357,596	19.59	.....	406	357,190	19.54
Vitrified block	17,390	1.04	.....	.....	17,390	1.04
Cobble	37,056	1.56	.....	682	36,374	1.52
Macadam (estimated)	1,882,559	120.85	5,956	14,205	1,874,310	120.58
Gravel and unimproved (traveled)	.....	148.88	.....	.....	.....	149.34
Gutters on asphalt streets	238,495	.....	2,869	.....	241,364	.....
Pavements maintained by street railways	564,525	.....	.....	.....	564,525	.....
Gutters on asphaltic concrete streets	11,201	.....	.....	.....	11,201	.....
Total	7,510,100	524.92	65,086	28,761	7,546,425	527.24

NOTE.—31,503.15 square yards sheet asphalt and coal tar pavements replaced, including 14,269.76 square yards of asphalt surface on old base.

The sums appropriated for expenditures during the year under this head were as follows:

For repairing old roadway pavements, including asphalt resurfacing	$642,500
For paving new roadways	144,840
For repair of suburban roads	250,000
For grading streets, alleys, and roads	35,000

The prices paid under contracts for roadway pavements during the year were as follows:

	Per square yard.
Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression), with 6-inch concrete base	$3.17
Laying vitrified block with 6-inch concrete base	3.27
Laying 6-inch concrete roadway	2.28

The prices paid for resurfacing and repairing asphalt pavements under one-year contracts which expired June 30, 1922, are as follows:

Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression), with 6-inch concrete base, per square yard	$3.17
Laying sheet-asphalt surface (2½ inches before compression), per square yard	1.17
Laying asphalt binder (in connection with resurfacing work), per cubic foot	.53
Laying sheet-asphalt surface for repairs, etc., within the space required by law to be kept in repair by street railway companies, per cubic foot	.70
Laying asphalt binder for repairs, etc., within space required by law to be kept in repair by street railway companies, per cubic foot	.60

Unit costs of work continued high. A pronounced characteristic of our field of work was an unprecedented development of property by builders on many streets either newly dedicated or lacking any surface improvements. The duty of supplying such improvements thus placed upon us was beyond our means and opportunities and the results of our efforts to perform it were quite inadequate to the necessities and disappointing to the property owners and ourselves. As a partial provision against such a contingency in the future a fund for the paving of such roadways on the deposit of the half cost by the property owners was successfully recommended to Congress.

SUBURBAN STREETS AND ROADS.

There were no notable individual items of street improvements and the entire schedule was much the smallest of any within our experience. The continued high cost of maintenance and entirely unsatisfactory condition of our heavily traveled suburban roads emphasizes the necessity of their prompt improvement with sheet asphalt on a concrete base as the only adequate correction. Recommendations made in previous reports as to restrictive legislation limiting the weights of loaded vehicles are respectively renewed.

MUNICIPAL ASPHALT PLANT.

The District of Columbia has operated a portable municipal asphalt plant in the repair of asphalt pavements and bituminous macadam roadways for the past 11 years. During the year 1922 the plant was operated for a period of 245 days, with a total output of 209,35[illegible] cubic feet of material, or an average daily output of 854 cubic feet. Additional asphalt material for street repairs supplemental to that furnished by the asphalt plant was purchased under contract from the Cranford Paving Co. to the amount of 12,076 cubic feet.

The details of the cost of the operation of the plant are contained in the report of the engineer of highways.

SIDEWALKS AND ALLEYS.

The sum of $285,000 was appropriated for paving sidewalks and alleys in all parts of the District and the sum of $20,000 for laying sidewalks and setting curbs around Government buildings, reservations, and parks. Sidewalks are paved with cement concrete under contract, while alleys are paved with cement concrete by day labor forces.

One-half of the cost of curb, sidewalk, and alley pavement is assessed against the abutting property, except that abutting public buildings and public reservations. The contract price for laying sidewalks during the year was as follows:

For large jobs adjoining paved streets, per square yard	$1.79
For large jobs adjoining unpaved streets and for small jobs, per square yard	1.97

The initiative in the matter of paving sidewalks and alleys is generally left with the owners of the abutting property, the commissioners requiring a majority petition for such work before it is ordered. Exceptions are made, however, in cases where, on account of public danger or other public reasons, the paving is demanded. The law requires the commissioners to advertise for two weeks their intention to lay sidewalks and curbs and to pave alleys and to give a hearing to the property owners affected. The work is ordered subsequent to such hearing when, in the opinion of the commissioners, it is necessary for public health, safety, comfort, and convenience. The demand for this class of construction is constant, and increased appropriations for this work could be advantageously expended.

BRIDGES.

Construction of a concrete retaining wall on Canal Road west of the Aqueduct Bridge was completed under contract with the Warren F. Brenizer Co. at a cost of $48,663.59, and also contract with the Miller & Dorsey Co., for driving and capping bearing piles and dredging at Wharf No. 6 was completed at a cost of $11,486.82.

Contract for the construction of new roadway floor on the Calvert Street Bridge was entered into with Royal J. Mansfield at a cost of $17,798.

Contract for the construction of reinforced concrete wharf decks at Wharf No. 6 was entered into with the Cambridge Manufacturing Co. at a cost of $14,260.

Contract for construction of nine reinforced concrete stalls at the N Street trestle was entered into with the Allen H. Rogers Co. at a cost of $9,643.50.

Contract for the construction of 12 concrete bins at the N Street trestle was entered into with Royal J. Mansfield at a cost of $14,984.

INSPECTION OF ASPHALTS AND CEMENTS.

Chemical and physical tests of materials entering into street and road improvements, such as asphalts, hydraulic cements, sands, road oils, etc., also fuel oils used at the municipal asphalt plant and cements used in sewer and building constructions, are made in the office of the inspector of asphalts and cements. Complete tests representing *many subdeterminations* were made as follows: Asphalt materials,

1,189; oils, 5; pitch, 1; sands, 92; cements 8,222, representing 82,243 barrels; gravel, 107; stone, 86; miscellaneous materials, 604 total, 10,306.

The samples of asphalt tested represent 2,215 tons which were used by contractors laying sheet asphalt and 521 tons which were used in the production of paving materials at the municipal asphalt plant. Of the materials tested, 3,110 cubic yards of sand were rejected.

SURVEYOR'S OFFICE.

The work of this office is divided into three classes: (1) Work for private parties, for which a fee is charged; (2) work for various departments of the District of Columbia and Federal Government, for which no fee is charged; and (3) survey, preparation, and report for all condemnation cases for streets, alleys, and parks.

SURVEYS FOR WHICH A FEE IS CHARGED (SURVEYS FOR PRIVATE PARTIES).

This work has greatly increased over any previous year. The orders for work in 1920 were 5,795; 1921, 8,450; while in 1922 they were 11,320, or an average of about 36 orders per day. This great increase is also shown by the cash receipts, which were $40,503.80 the past fiscal year, as compared to $25,355.82 for the fiscal year ended June 30, 1921.

This places more work upon the office than it has been able to do promptly and efficiently with the present force, and, as the work is performed for the public, prompt service is demanded.

A table has been submitted showing in detail the amount of work of all kinds for the past two fiscal years for purpose of comparison. This shows the number of surveys for private parties for 1921 was 1,645 and 2,227 for 1922. The number of resurveys, or surveys to examine walls of houses being erected, was 1,084 for 1921 and 1,700 for 1922; the number of subdivisions made, 228 for 1921 and 532 for 1922; subdivisions recorded, 212 for 1921 and 470 for 1922. The total of surveys for both the District of Columbia and private parties was 3,124 for 1921 and 4,135 for 1922, and the total of plats of all kinds drawn by this office was 8,204 for 1921 and 12,100 for 1922.

CONDEMNATION OF STREETS, ALLEYS, AND SMALL PARKS.

Forty-six condemnation cases were before the courts during the past fiscal year, divided into 26 street and building restriction line cases, 8 park cases, and 12 alley cases. The total amount awarded as damages for the cases confirmed was $127,641.94 for streets, parks, etc., and $7,715.42 for the condemnation of alleys.

Some of the important cases now in court are (1) the opening of all streets in Barry Farm; (2) the opening of Webster, Allison, and Buchanan Streets and Arkansas Avenue; (3) the opening of Western Avenue between Massachusetts Avenue and Wisconsin Avenue; and (4) the widening of Southern Avenue between Bonini and Livingston Roads.

All plats and descriptions in the matter of condemnation of streets in Barry Farm have been completed by this office. This is probably the largest individual case for the opening of streets that this office has ever submitted for condemnation.

Other large projects being prepared by the office are the proposed widening of Canal Street from Thirty-sixth and M Streets, Georgetown, to the Conduit Road; the widening of Broad Branch Road from the District line to Rock Creek Park; and the widening of Benning Road from Anacostia Avenue (Benning) to the District line. These projects are very desirable to provide better facilities for traffic before improvements are constructed which will make the cost of condemnation prohibitive.

PARKS.

The plan of the original city of Washington provided for a comprehensive street plan and beautiful parks. A comprehensive street plan outside of the original city was adopted by Congress in 1893, but no provision was made for a park plan. If subdivisions continue to be made of the land outside of the original city limits, much beautiful and desirable land suitable for parks will be lost for that purpose. There is nothing which will promote the health and happiness of the people of the city more than outdoor recreation and playgrounds, and the new Washington, being created beyond Florida Avenue, will not have the benefit of these park areas unless some provision is made before the land is subdivided and improved.

The office has from time to time recommended the acquisition of Piney Branch parkway, Klingle Road valley, and the Patterson tract for parks. They are beautifully situated and mostly covered with magnificent trees, and are ideal for park purposes. Improvements are being made so rapidly which are encroaching upon Piney Branch parkway and Klingle Valley park that if some action is not taken at once they will be lost as parks.

There is no link in the chain of parks in the District so important as the Klingle Road valley. This is covered with most beautiful trees, and will connect Potomac Park and the Mall on the south with Rock Creek Park on the north without passing through Zoological Park. If this link is acquired it will complete the park system from the south end of Potomac Park to the north end of Rock Creek Park, which is the north end of the District, making one of the most beautiful chains of parks in any city of the country.

The enactment of legislation to acquire the Civil War forts and a fort drive connecting the same is a matter that should be considered. There are some 40 forts and batteries in the District which formed the defenses of Washington. Some have been destroyed by improvements, while many still remain. Their acquisition would be of historic interest and a fort drive connecting them would constitute a beautiful boulevard, which would connect all parts of the District.

TREES AND PARKINGS.

The number of trees planted along the curbs in the streets of the District of Columbia at the close of the fiscal year was 105,889, an increase over the preceding year of 86.

Nearly all of the trees planted were for the purpose of filling vacancies in existing rows in the northwest and southwest sections of the city.

The nursery at Fort Dupont is still being used for the propagation of trees for street planting. There is not enough ground available in *the tract to grow the total* number of trees necessary to keep pace

with the rapid growth of the city. During the fiscal year 1,535 Norway maple, 542 red maple, 828 red oak, 1,393 pin oak, and 228 elm seedlings were planted in the nursery rows.

No systematic trimming was undertaken during the year, but to offset this the "floating gang" accomplished much trimming on individual requests. It is the intention to resume the systematic trimming of all the trees on the streets in the northwest section of the city, west of eighteenth Street and south of Florida Avenue in the near future. The total number of trees trimmed during the year was 8,796.

STREET AND ALLEY CLEANING AND COLLECTION AND DISPOSAL OF CITY REFUSE.

Eight hundred thousand dollars was appropriated for the collection and disposal of garbage, ashes, and miscellaneous refuse, and $375,000 for dust prevention, cleaning of streets and alleys, and for snow removal. Because of the exceptionally heavy snowfall in the last days of January, necessitating extraordinary expenditure for its removal, an additional sum of $30,000 was appropriated by Congress to cover this cost.

This snow clearly indicated that the equipment available for such work was entirely inadequate. To cover this deficiency, trucks, plows, and tractors have been purchased with which to keep the street open for travel in future snowfalls.

In street and alley cleaning work it is to be noted that the unit costs per 1,000 square yards have returned to about pre-war costs. An innovation this year was the use of motor driven sweepers. The cleaning was done in this way at a cost considerably less than by horse-drawn machines.

The amount of garbage collected was over 15 per cent greater than in the previous year. A total of 69,452 tons was collected at a cost of $233,640.60. The disposal of this garbage cost $154,799.62, but in reducing it there was produced grease which was sold for $121,532.07. Besides this, tankage was made which may be sold when prices for this material are better, so that it is estimated the net cost of disposal of the city's garbage was only slightly over $5,000.

Because of the cold winter, the quantity of ashes collected and disposed of was greater than usual, amounting to 156,100 cubic yards.

The cost of collection and disposal of miscellaneous refuse from householders was $194,805.64, but there was salvaged and sold sundry material to the value of $67,458.68, so that the net expense of this work was $127,346.96.

Because of the many new houses being built, the amount of refuse to be collected has increased very materially. This condition requires added expenditure for this work as well as new equipment, repairs to plant, and added facilities not permitted by previous appropriations.

BUILDING OPERATIONS.

The estimated value of building construction, including repairs, during the year was $36,197,059, an increase of $17,197,133, as compared with the fiscal year 1921.

The number of permits issued was 10,301, an increase of 1,991 over the previous year. This is the greatest number of permits ever issued for any fiscal year by the building division. The total number of new buildings erected was 3,510, an increase of 1,905. There were 2,397 dwellings, an increase of 1,625; 60 apartment houses, an increase of 46; and 1,053 business buildings, an increase of 234. The number of permits issued to repair buildings was 5,664, an increase of 341.

This astonishing increase in the estimated value of building construction, notwithstanding it approximates the total valuation of building operations in some of the so-called banner years, will not prove abnormal as compared with building construction in the future so as far as a judgment may be based on the present and prospective activities in this respect. Since the close of the fiscal year there has been no diminution in the number of permits issued nor in the filing of plans for major operations.

The cost of materials and of labor continues much above the normal, yet the demand for both seems as insistent as at any time during the year.

The act to regulate the height, area, and use of buildings, commonly known as the zoning law, and the regulations promulgated thereunder, are generally received with favorable recognition and an apparent desire on the part of the public to conform therewith.

During the past year there were issued 3,002 conforming certificates of occupancy and 295 noncomforming certificates, the fees therefor totaling $3,305.50 as compared with $2,400 for the year 1921.

As this office is charged with the responsibility of administering the zoning law it is regrettable that the office has no clerks who may be assigned to this work. The present method is to transfer employees from other departments, two being engaged now, a third having been retired because the appropriation under which he was employed expired at the close of the fiscal year 1922 and was not renewed for the present fiscal year. Satisfactory administration urgently dictates an increase of the clercial force of this department by at least three men, in order that a force sufficient to cope with the administration might be assured the year round.

Attention is invited to the fact that the receipts of this bureau for the fiscal year were $51,126, the salaries amounted to $38,503, a difference of $12,622. This increase of receipts above expenses indicates to a marked degree the additional labor imposed upon the employees, and should dictate, it is believed, a corresponding increase in salaries.

CONSTRUCTION OF MUNICIPAL BUILDINGS.

During the year 14 buildings operations were in progress, as follows:

The psycopathic group of buildings and power house and domestic buildings for the Gallinger Municipal Hospital; the remodeling of the Phelps School; a 4-room addition to the Monroe School; a 4-room addition to the Deanwood School; a 12-room addition to the Wheatley School; an 8-room addition to the John Eaton School; an 8-room addition to the Lucretia Mott School; the superstructure of the new

Eastern High School; an 8-room school building known as the Richard Kingsman School; an 8-room addition to the Buchanan School; an 8-room school building to replace the Bell School; and the southeastern branch library. A part of the south shelter for the farmers' produce market was also in course of erection.

In addition to the preparation of plans and specifications for the above structures, plans and specifications for about 40 other items of work, such as heating systems for engine houses and school-buildings, cells and other work in police stations, etc., were prepared by this office, amounting to approximately $61,489. Contracts entered into through this office amounted to a total of $2,334,055.

REPAIRS TO MUNICIPAL BUILDINGS.

All municipal buildings are kept in repair under the direction of the municipal architect. During the year only such repairs were made as would prevent further deterioration of structures, as the continuance of high wages and high prices of materials prevented the prosecution of more extensive repair work with the limited funds available.

The appropriations for repair work and the expenditures of the same were as follows:

Repairs to school buildings: Two hundred and twenty-five thousand dollars was appropriated and all but $167.16 expended. Twenty thousand dollars was appropriated for repairs to engine houses and grounds, and all was expended. Eight thousand dollars was appropriated for repairs to police stations and grounds, and all but $23.41 was expended. Three thousand dollars was appropriated for repairs to the police court building, and all but $47.43 was expended.

In addition to the above, repairs were made to various buildings under the control of the commissioners, to the amount of $74,461.02.

Steam boilers in 89 municipal buildings were inspected and repaired.

WORKHOUSE AND REFORMATORY.

The work accomplished at the workhouse and reformatory during the past year has been quite satisfactory. Definite plans for the general scheme of buildings for the workhouse have been made and approved, and it is expected that these plans in detail will be completed during the current year and building operations begun on some of the buildings.

At the reformatory several of the shops have been completed as well as two disciplinary wards. Three dormitory buildings have been started, one of which is practically ready for the roof.

Plans are being developed for the enlargement of the power house.

THE DISTRICT BUILDING.

The routine work incident to the maintenance of the District Building involves several distinct functions, viz: The power plant; woodworking, paint, electrical, blue-print, photograph, and printing shops; and the elevator, watch, and cleaning forces. During the year 2,003 tons of coal were consumed, which coal ran 31.1 per cent *ash as compared* with 15.9 per cent last year.

Four hundred and forty-four thousand four hundred and thirty kilowatt hours of current was generated, of which 294,250 were used for lighting, 53,950 for elevators, and 96,330 for motors. Electric current used by the various departments for purposes other than lighting amounted to 43,713 kilowatt hours. The print shop completed 1,400,569 pieces of printed matter at a cost of $6,639.02, while the blue-print and photograph shop completed 183,608 square feet of blueprinting and 2,550 photographs at a total cost of $8,103.22. The price of blue printing was reduced from 4 to 3 cents per square foot. A dryer for the Pease blue-printing machine was purchased at a cost of $600.

Because of the continued growth of old departments and the creation of new departments, additional floor space is needed and should be provided either by constructing an addition to the District Building or by acquiring adjacent property.

MUNICIPAL GARAGE.

During the fiscal year 44 automobiles were maintained and kept in running order. The garage was kept open day and night, all machines being washed and supplied with oil and gasoline by the night force. A laboring and mechanical force of eight men made the necessary repairs and operated automobiles for departments having no drivers. A battery charging outfit was installed. The total operating expenses for the maintenance of the automobiles referred to, including gas, oil, tires, and miscellaneous supplies, amounted to $18,500.67 or an average of $420.46 for each car, or $0.0532 per mile. The average mileage per car was 5,417 miles.

PLUMBING INSPECTION.

During the year the plumbing inspection division made a total of 41,725 inspections, which included inspections of plumbing construction work in new buildings, plumbing repairs in old buildings, and visits of investigation following complaint of insanitary conditions. This is approximately the same number of inspections as was made last year, but by reason of the more extensive building in the suburbs it required more time on the part of the men. The records show that the average number of inspections per day per man was nearly 14. Practically one-third of all of the above inspections, as well as more than half of the clerical work in the office, was due to complaints of insanitary plumbing in old houses or defective sheet-metal rain leaders and gutters, this great number of complaints being undoubtedly due to the present housing situation in the District of Columbia.

During the year 39 warrants were sworn out in police court for violation of the plumbing regulations, of which but 2 cases were dismissed for lack of evidence. The fines collected amounted to $385.

There were also 275 prosecutions under the nuisance and drainage acts, of which the plumbing division found it necessary to do the work in 45 cases and assess the cost.

PLUMBING BOARD.

There were 66 applicants for examination for license as master plumber and gas fitter, of whom 11 passed and were granted license, and there were at the end of the year 238 registered master plumbers, about 190 of whom were actively engaged in business.

PUBLIC-CONVENIENCE STATIONS.

The four convenience stations were operated throughout the year from 6 a. m. until midnight daily, including Sundays, and there were registered over 13,000,000 users. The cash receipts amounted to $9,377.03.

INSPECTION OF STEAM BOILERS.

The number of steam boilers inspected by the inspector of steam boilers during the year was 470, including 36 belonging to the District of Columbia. Twelve boilers were condemned as unfit for further use. The compensation of the inspector of steam boilers is paid from fees collected from private owners of boilers. The total amount of fees reported by that official was $2,350, and the expense of inspection $370, leaving a net compensation to him of $1,980.

EXAMINATION OF STEAM ENGINEERS.

The board of examiners of steam engineers held 54 meetings and examined 262 applicants, of whom 172 were found competent and 90 incompetent.

STREET LIGHTING.

There are 20,708 street lamps of all kinds in the avenues, streets, alleys, etc., under the jurisdiction of the Commissioners of the District of Columbia, as follows:

Gas, mantle:		
Single burner	10,617	
Double burner	117	
		10,734
Electric, arc:		
6.6-ampere magnetite	283	
4.0-ampere magnetite	500	
		783
Electric, incandescent:		
250-candlepower, series	89	
200-candlepower, multiple	64	
100-candlepower, series	4,060	
100-candlepower, multiple	98	
60-candlepower, series	4,021	
60-candlepower, multiple	274	
		8,606
Street designation:		
Gas, 2½-foot, flat flame	401	
Electric, 8-candlepower	184	
		585
Total		20,708

This was a net increase during the year of 366 lamps.

The additions and extensions, 157 gas, 209 electric, have been of a minor sort, to meet pressing demands and needs, mostly in streets newly built upon, the largest single installation being 17 lamps, and

82 per cent of the increase being widely scattered in lots of 5 or less. At some points especially indicated, congested intersections, car stops, etc., the size of lamps has been increased, but of the 603 lamps newly connected (gross), 337, or about 56 per cent, were either "designation" lamps or the lowest powered gas or electric.

A material improvement in effectiveness of lighting results from trial change of equipment to double burner inverted gas mantle, to the number of 117, at street intersections, with single inverted intermediate. Trial installations have also been made of lights for traffic guidance purposes to the number of 12 of several different types, all considered of value in traffic control.

Replacement of some of the gas lamps by electric and of some of the existing electric by larger and more effective units, to provide a higher degree of visibility, is necessary to safety, in view of modern traffic conditions.

The situation with respect to suits against certain railroad companies to recover for lighting streets, etc., adjacent to their rights of way, remains essentially as reported for the past two years, the necessary new trial in lower court not having been reached.

SIGNAL SYSTEMS—FIRE-ALARM TELEGRAPH, POLICE-PATROL SIGNAL, AND TELEPHONE SERVICE.

There were 739 fire-alarm boxes in service at the end of the year, 626 on underground and 113 on overhead wires, a net increase of 25 over the preceding year; 984 box fire alarms and 1,007 local alarms were received and transmitted during the year, of which 139 box and 42 local were false.

Additional apparatus at fire-alarm headquarters to increase the number of box circuits by 10, to 40, was installed and connected to the switchboard; the rearrangement of box circuits and increase in number to relieve overloading is in progress.

There were 487 police patrol boxes in service at the end of the year, 384 on underground and 103 on overhead wires, an increase of 12 over the preceding year.

There were 1,453 telephones connected to the District system at the end of the year, and 27 in use as portable sets by fire and electrical departments, an increase of 26 in the year.

The number of cells of storage battery in service on fire-arlarm, police patrol, and local circuits remains unchanged at 2,174. The battery room has been enlarged and the battery rack extended to accommodate increase of battery about to be made.

There were in service on the composite signals system on June 30, 1922, 165.54 miles of underground cable, containing 6,460.04 miles of conductors, and 174.81 miles of aerial conductors, a grand total of 6,634.85 miles of conductors, a net increase of 85.85 miles of conductors. Reserve capacity of several of the cables is below requirement of demand and below safe emergency provision. Provision for expansion is again presented as an urgent requirement.

The use of radio communication for municipal functions has been recognized by the assignment of a band of wave lengths in the regulations being promoted by the Department of Commerce and the utilization of that new art by the District in the near future may be advantageous.

ELECTRICAL INSPECTION.

The total number of permits issued for installation of wires and apparatus for electric light, heat, and power purposes on private premises, not including distribution or other plants of public-service companies, during the year was 8,029, compared with 6,217 in the preceding year, representing approximately 8,822 kilowatts capacity of utilization equipment. The total amount of fees paid for permits for such installations was $13,861, compared with $11,626. The total number of inspections recorded, relating to this work, was 17,284 compared with 14,965. The annual increase of service to be rendered is marked and the service rendered has reached the saturation point; in fact adequate inspection with the number of inspectors engaged is not physically possible.

Supervision was exercised over the erection, taking down, and moving of an aggregate of 2,204 line and guy poles and 468 pole guy anchors, and of the stringing of overhead wires in streets and other public spaces. The total of recorded wire-supporting poles in the District at the end of the year was: Line, 19,690; guy, 1,224; total, 20,914, compared with a total of 20,002 at the end of the preceding year, a net increase of 912; representing an exceptional activity, due doubtless to the exceptional suburban development. The telephone company has increased by 1 the number of its poles in streets within the area prescribed in the act of Congress regulating the use of telephone wires approved June 30, 1902.

MISCELLANEOUS.

The electrical department has cooperated with the municipal architect and other District officers, consulting and counseling, preparing plans, specifications, and estimates, and supervising electrical work. This service has been somewhat exceptional in extent, due to the school building program.

HARBOR FRONT.

The annual rental of the wharves on the river front placed by law under the control of the commissioners as of June 30, 1922, follows:

Washington Channel	$15,269.00
Anacostia Channel	400.00
Georgetown Channel	534.60
	16,203.60

The actual water frontage of the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water front is 18 miles, of which about 8 miles is set aside for parks and for other purposes of the United States. The largest amount of wharf property under the control of the commissioners is along the Washington Channel.

The harbor police station and dock, the dock of the fire boat, the District morgue, the municipal fish wharves and market, and the

District workhouse and sand wharves are located along the Washington Channel between the south curb line of N Street and Thirteenth Street. The balance of the frontage is leased by steamboat companies boathouses, and other commercial interests.

The Board of Engineers of Rivers and Harbors has under consideration the matter of establishing a bulkhead along the Washington Channel with a view to providing ultimately maximum facilities for all legitimate water-front uses, both governmental and commercial.

CONDEMNATION OF INSANITARY BUILDINGS.

The board of condemnation of insanitary buildings held 18 meetings and issued orders for the demolition of 132 and the repair of 117 structures. Of the buildings condemned 84 were located on streets and 48 on alleys.

Since the creation of the board May 1, 1906, it has examined 8,421 buildings, of which 2,677 were demolished and 2,029 repaired. Of the buildings demolished 1,779 were located on streets and 898 on alleys.

The estimated value of repairs required by the board during the year ended June 30, 1922, is $46,430.

Estimated value of repairs required by the board during the past four years $214,620.

One hundred and thirty-four 20-day preliminary notices were served on owners to show cause why buildings should not be condemned.

Forty condemnation orders were served.

Forty-nine condemnation cards were affixed to buildings.

Sixty-nine condemnation orders were served under section 16 of the building code.

One thousand four hundred and fifty-nine inspections and miscellaneous visits were made.

Estimated number of people required to secure other living quarters, 528.

Number of cases in court, 1.

Estimated number of tenants and occupants of dilapidated and insanitary buildings benefited by repairs required by the board during the year ended June 30, 1922, 585.

Estimated number of tenants and occupants of insanitary and dilapidated buildings benefited by repairs since the creation of the board, 7,421.

SEWERAGE AND SEWAGE-DISPOSAL SYSTEMS.

The construction and maintenance of the sewerage system and the sewage-disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer.

The length of main and pipe sewers constructed during the year was 10.09 miles. The total length of main and pipe sewers on June 30, 1922, was 763.97 miles, of which 152.31 miles are main sewers and 611.66 miles are pipe sewers. In addition to the above new sewer work, 83 storm-water catch basins were constructed during the year, bringing the total number to 6,302.

There was expended during the year on new extensions of the sewerage system the sum of $310,717.60, and on the sewage-disposal system $4,885.71. The total cost of the sewerage system to June 30, 1922, was $15,412,515.28. The total cost of the sewage-disposal system to the same date was $5,975,232.96, making a total cost of the complete system to June 30, 1922, of $21,387,748.24.

The main sewerage pumping station and the three substations were in continuous operation throughout the year, handling the sewage of practically the entire district. In addition, the main station pumped storm water from the 900-acre low level area flanking Pennsylvania Avenue between the Peace Monument and Fifteenth Street. At the main station, sewage to the amount of 24,906,695,603 gallons and storm water to the amount of 2,319,731,496 gallons were pumped during the year. The Poplar Point substation pumped 821,735,317 gallons, the Rock Creek substation 125,879,731 gallons, and the Woodridge substation 15,293,400 gallons of sewage during the year. Eliminating the Rock Creek and Woodridge substations, which deliver their discharge to the main station, the above would indicate a mean daily pumpage of sewage of 70,438,852 gallons. The coal consumption at the main sewerage pumping station for the year amounted to 5,963 tons.

Pursuant to act of Congress approved September 1, 1916, to protect streams flowing through United States parks and reservations in the District of Columbia from pollution, and the act of the Maryland State Legislature approved April 10, 1918, the commissioners have prepared and submitted to the Washington suburban sanitary commission a working agreement to govern the conditions under which Maryland sewage may be diverted through the district sewers to the District sewerage pumping station. In advance of carrying out the terms of above agreement it will be necessary to extend, at an estimated cost of $750,000, the three principal sewage interceptors to the District line.

Attention is called to the fact that the extension of the sewer system has been allowed to lag considerably behind the growth of the city and, due to the lack of storm-water sewers, the problem of handling surface water is becoming more and more difficult. Furthermore there is a decided need for relief sewers within the old city limits to prevent the recurrence of flooded premises due to the inadequacy in size of many of the older sewers.

Attention is also called to the fact that it was not possible to keep the extension of the sewer system abreast of the building activities during the year, which activities exceeded those of any previous year, and the fiscal year ended with service sewers, estimated to cost over $120,000, authorized constructed for the service of new buildings but not built on account of lack of funds.

WATER MAINS.

During the year 61,862 feet or 11.7 miles of water mains were laid, making a total length of mains now in service 659.2 miles. There were also in service at the end of the year 11,362 valves of various sizes, 3,814 fire hydrants, 253 public hydrants, 21 sanitary fountains, 153 horse fountains, and 44 public wells.

The aggregate cost of the water mains in service June 30, 1922, *paid from* water department funds, was $4,477,732.02.

WATER CONSUMPTION.

The mean daily consumption for the fiscal year was 63,309,230, being 1,802,400 gallons more than the mean daily consumption for 1921. Making a mean daily per capita consumption of 140.68 gallons—estimated on a population of 450,000.

The total pumpage for the year was 11,832,035,550 gallons.

The total coal burned was 7,333 tons.

The cost of operating pumps for the year was $102,637.92 as against $118,195.29 in 1921; thus making the cost of pumping 1,000,000 gallons of water into the mains $8.74, as against $10.40 for the preceding year.

Underground leakage found and stopped during the year amounted to 1,678,500 gallons daily. The largest quantity found since the year 1917.

WATER REVENUES AND EXPENDITURES.

The revenues from all sources, including a balance of $161,344.46 in the Treasury, amounted to $1,307,760.27.

Expenditures of the water department amounted to $771,763.74; advances on account of the Washington Aqueduct $224,921.47, leaving a balance of $311,075.06, which is obligated to the amount of $61,086.50, which leaves an unobligated balance of $249,988.56. Of the total cost of work done during the year 34 per cent was expended for new work and 66 per cent for maintenance.

WATER METERS.

Two thousand and forty-three water meters were installed at an average cost of $10.50 each.

The revenue collected for the year under the meter system was $840,747.29; under the flat-rate, $97,458.52; for building purposes, $4,976.64.

Sixty-four thousand five hundred and forty-five services are now metered.

Very respectfully,

CUNO H. RUDOLPH,
JAMES F. OYSTER,
CHARLES KELLER,
Commissioners of the District of Columbia.

REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA.

REPORT OF ASSISTANT ENGINEER COMMISSIONER BESSON.

WASHINGTON, D. C., *September 15, 1922.*

SIR: I have the honor to transmit herewith the annual reports of the operations of the various divisions and offices under my immediate supervision for the fiscal year ended June 30, 1922.

Very respectfully,

F. S. BESSON,
Major, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.

The ENGINEER COMMISSIONER.

REPORT OF ENGINEER OF HIGHWAYS.

WASHINGTON, D. C., *August 15, 1922.*

SIR: I have the honor to submit the following report of the operations of the engineer of highways for the fiscal year ended June 30, 1922. The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the highway division aggregated $1,755,447.38, of which $285,000 was for paving sidewalks and alleys in all parts of the District; $144,840 for paving new roadways, $642,500 for repairing old roadway pavements, including asphalt resurfacing; $250,000 for repair of suburban roads; $27,500 for construction and repair of bridges and viaducts; $35,000 for grading streets and avenues; $20,000 for sidewalks and curbs around Government reservations, buildings, and parks; $30,000 for reconstructing trestle and bins in N Street NE., between First and Second Streets; while $320,607.38 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

Summary of work under appropriation for improvement and repairs for year ending June 30, 1922.

Character of work.	Street improvements.	Repairs to asphalt pavements.	Total.
Sheet-asphalt pavements.....square yards..	28,827.99	32,179.15	61,007.14
Asphalt-surface pavements.....do....	186.67	14,269.76	14,456.43
Vitrified block, gutter.....do....	1,964.99	2,222.10	4,187.09
Cement concrete pavements.....do....	11,486.95	.....	11,486.95
Macadam roadway.....do....	5,956.00	.....	5,956.00
Old pavement removed.....cubic yards..	.....	4,295.58	4,295.58
Old cobble and granite removed.....square yards..	4,030.03	.....	4,030.03
Granite and bluestone set.....linear feet..	7,725.90	4,973.75	12,699.65
Cement curb formed and laid.....do....	5,603.14	.....	5,603.14
Curb reset.....do....	3,222.28	10,604,98	13,827.26
Grading.....cubic yards..	181,556.30	2,431.50	183,987.80
Cement sidewalks laid under assessment and permit work .....square yards..	.....	.....	37,010.85
Cement sidewalks laid around Government reservations.....do....	.....	.....	6,562.96
Alley pavements, assessment and permit work, cement.....do....	.....	.....	60,174.70

The following is the list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1922.
Tables B and C.—Statement of character and extent of street pavements.
Table E.—Street improvements.
Table F.—Repairs to asphalt and coal-tar pavements.
Table G.—Work done for street railway companies.
Table H.—Work done by day labor under appropriation for "Repairs to streets, avenues, and alleys."
Table I.—Regular permit work.
Table K.—Assessment work.
Table L.—Replacing and repairing sidewalks and curbs around public reservations.
Table M.—Miscellaneous work.
Table N.—Whole-cost work.
Table O.—Repairs to cuts by plumbers and others.
Table P.—Grading streets, alleys, and roads.

Of the above tables, B, C, and O are printed herewith. The remaining tables are on file in the record room of the office of the engineer of highways, plan case No. B-1108.

Unit costs of work continued high. A pronounced characteristic of our field work was an unprecedented development of property by builders on many streets either newly dedicated or lacking any surface improvements. The duty of supplying such improvements thus placed upon us was beyond our means and opportunities and the results of our efforts to perform it were quite inadequate to the necessities and disappointing to the property owners and ourselves. As a partial provision against such a contingency in the future, a fund for the paving of such roadways on the deposit of the half cost by the property owners, was successfully recommended to Congress.

There were no notable individual items of street improvements and the entire street schedule was much the smallest of any within our experience.

At the end of the year all work had been practically completed except a small sidewalk contract, a contract for a concrete trestle, and one for a bridge floor.

The continued high cost of maintenance and entirely unsatisfactory condition of our heavily traveled suburban roads emphasizes the necessity of their prompt improvement with sheet asphalt on a concrete base as the only adequate correction.

Alleys were paved with cement concrete to the extent of 60,174.70 square yards.

MUNICIPAL ASPHALT PLANT.

The total output of the municipal asphalt plant for the year was 209,352 cubic feet of material, consisting of 182,328 cubic feet of old material mixture and 27,024 cubic feet of topping mixture. The plant was operated for 245 days, with an average daily output of 854 cubic feet. In connection with the output of the plant, the crusher was operated for 72 days during the year and 4,592 cubic yards of old material hauled to the plant from various streets was crushed.

Constant attention is given to the maintenance of both the plant and the crusher, repairs being made and parts replaced when necessary, thereby keeping them in the best operating condition possible. This cost is incorporated in the total cost of output shown below.

The following materials in amounts set forth below were purchased for use in manufacturing the output during the year:

Limestone dust, 250 tons, cost average	$4.86
Sand, 3,220 cubic yards, cost average	1.81
Asphaltic cement, 521.32 tons, cost average	22.18

There were purchased for use in operating the crusher and mixer the following large items:

Fuel oil, 39,940 gallons, cost average	$0.0545
Coal, 208 tons, cost average	7.30
Wood, 75 cords, cost average	16.04

The cost of operation, including labor and material, are kept from day to day and the summary of this data for the fiscal year develops the following unit costs for the year's operation:

Operation of crusher.

[Period of operation, 72 working days: output of crusher, 4,592 cubic yards.]

Labor and fuel (cost per cubic yard, $1.03)	$4,732.62
Maintenance, renewals, and repairs (cost per cubic yard), $0.118)	544.49
Overhead cost: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
Cost of crushed product per cubic yard:	
Labor and material	1.03
Repairs to plant	.118
Total cost	1.148

Operation of plant.

[Period of operation, 245 days: total output, 209,352 cubic feet.]

At plant:	
Labor (8.96 cents per cubic foot)	$18,763.73
Fuel oil (0.96 cent per cubic foot)	2,010.96
Coal (0.65 cent per cubic foot)	1,365.71
Wood (0.27 cent per cubic foot)	565.25
Total (10.84 cents per cubic foot)	22,705.65
Haul from plant to street:	
Labor (8.01 cents per cubic foot)	16,545.85
On street:	
Labor (25 cents per cubic foot)	51,664.19
Painting joints (0.34 cent per cubic foot)	762.44
Wood (0.30 cent per cubic foot)	628.06
Total (25.64 cents per cubic foot)	69,600.54
Maintenance and repairs:	
At plant (1.30 cents per cubic foot)	2,728.38
On street (0.30 cent per cubic foot)	630.52
Total (1.60 cents per cubic foot)	3,358.90
Overhead: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
Supervision:	
Foremen and overseers (3.12 cents per cubic foot)	6,538.05
Total manufacturing cost per cubic foot:	
Plant labor	$0.1084
Hot haul	.0801
Street work	.2564
Maintenance of plant and tools	.0160
Supervision	.0399
Total	.5008

The sand used was bought under contract at 80 cents per cubic and hauled from the wharf to the plant at the cost of $3,221.2 3,204.50 cubic yards, or $1.01 per cubic yard, a total of $1.8 cubic yard. All other expendable material was delivered a plant site at the cost thereof used herein.

The cost of a cubic foot of old material mixture from the a was as follows:

0.65 cubic foot of old material, at $1.15 per cubic yard	$
0.35 cubic foot sand, at $0.80 per cubic yard; hauled, $1.01 per cubic yard	
3.33 pounds limestone dust, at $4.86 per ton	
5.04 pounds asphaltic cement, at $22.18 per ton	
Cost of material	
Manufacturing and placing cost	
Total cost per cubic foot	

Topping mixture:

1 cubic foot of sand, at $0.80 per cubic yard; hauled, $1.01 per cubic yard	
4.20 pounds limestone dust, at $4.86 per ton	
10.08 pounds asphaltic cement, at $22.18 per ton	
Cost of material	
Manufacturing and placing cost	
Total cost per cubic foot	

The total cost of minor repairs to sheet asphalt pavements d the year, the same representing the maintenance cost during the was $94,489.18. This cost represented the maintenance of all as and asphaltic concrete streets not under guaranty by contracto total yardage of 3,507,419. The cost per square yard per year therefore about 2.69 cents.

For purposes of record and comparison the like annual cost here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914 cents; 1915,1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 c 1919, 3.07 cents; 1920, 3.38 cents; 1921, 3.75 cents.

The municipal asphalt plant began operations in 1912, re being made by contract during the first quarter of that year, and the municipal asphalt plant during the last three quarters of year and continuously since. The marked reduction for the 1917 is affected very significantly by the law effective that yea which repairs to pavements over one year old are chargeable to r appropriations instead of being paid for by the paving contra under a five-year guaranty, as formerly. The yardage of paver over which our repairs were distributed was thus increased by n 700,000 square yards, on which practically no expenditures needed, as the pavements were only from one to five years old.

In connection with these costs of annual repair it should be sidered that some of the streets approximate an age of 40 years that the average age of those we have resurfaced in recent years exceeds 25 years. The average age of streets resurface 1910 was 25.8 years; in 1911, was 24.5 years; in 1912, was 25.8 y in 1913, was 26 years; in 1914, was 28.5 years; in 1915, was 28 y in 1916, was 29.6 years; in 1917, was 27 years; in 1918, was 26 y in 1919, was 26.7 years; in 1920, was 23.6 years; in 1921, was years; in 1922, was 28.7 years.

During the year there was purchased from the Cranford Paving Co., under contract No. 7324, the following material in bulk at contractor's plant, to be used in connection with minor repairs to asphalt pavements and repairs to cuts:

3,072.00 cubic feet of topping, at 47 cents per cubic foot	$2,853.84
6,004.00 cubic feet binder, at 41 cents per cubic foot	2,461.64
Total	5,315.48

This was material hauled from plant and laid in the streets by the District of Columbia minor-repair forces.

This procedure was in continuation of that of the preceding year, though more limited as to amount involved. The municipal plant alone could hardly have met the aggregate needs of our work and was not subjected to the injurious strain of attempting it.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

STREETS.

Repairs to streets, avenues, and alleys, appropriation 1922, were made under the immediate supervision of the superintendent of streets, as follows:

Concrete roadway	square yards	110
Brick sidewalk relaid	do	11,857
Asphalt block paved	do	942
Asphalt black repaved	do	15,674
Vitrified block paved	do	2,087
Vitrified block repaved	do	5,404
Curb reset	linear feet	1,625
Flag relaid	square yards	98
Granite block laid	do	7,434
Cement walk relaid	do	4,431
Grading	cubic yards	5,640
Labor		$117,180.72
Material		$11,983.89

SUMMARY.

Northwest section, east of Sixteenth Street	$42,387.29
Northwest section, west of Sixteenth Street	14,895.00
Northeast section	29,737.74
Southeast section	23,048.86
Southwest section	12,301.58
Georgetown	9,954.95
Total	132,325.42

SUBURBAN ROADS.

The appropriations expended under the immediate supervision of the superintendent of suburban roads for the year ending June 30, 1922, are as follows:

For repairs to suburban roads and streets	$250,000
For repairs to streets, avenues, and alleys (direct charge)	[1] 43,588
For grading streets, alleys, and roads	35,000
Special appropriations for grading—	
Second Street, Eastern Avenue to Whittier Street	10,795
Thirteenth Street NW., Buchanan Street to Shepherd	14,155
Paving cement roadways, suburban	45,855

[1] In addition to this a large amount of suburban work was done from this appropriation.

In addition to the above all cuts in the suburban area were repaired by this division.

Tabulated statements of work done are on file in this office.

The recommendations made in the previous reports of this office relative to the early paving of trunk highways, the use of bituminous macadam on roadways of secondary importance, and as to restrictive legislation limiting the weights of loaded vehicles, are respectively renewed.

BRIDGES.

The following work, under the immediate supervision of the engineer of bridges, was performed during the year:

Reflooring of Chain Bridge, part of Pierce Mill Road Bridge over Piney Branch, Connecticut Avenue Bridge over Klingle Road, and Kenilworth Avenue Bridge over Watts Branch.

Painting of the Calvert Street, P Street, M Street, and K Street Bridges over Rock Creek.

Culverts were constructed at Bladensburg Road and Queens Chapel Road and at Canal Road west of Foxall Road.

A concrete floor was constructed on the bridge on Forty-fourth Street over Watts Branch and a timber floor on bridge at Kenilworth Avenue and Polk Street NE.

Minor repairs were made to various bridges.

The appropriations for the Highway and Anacostia Bridges were expended practically in full.

EXPENDITURES FOR BRIDGE REPAIRS, PAINTING, CONCRETE WORK, ETC.

Repairs to N Street oil trestle by day labor	$444.28
Repairs to hand rail and painting portion of floor system by day labor on the Highway Bridge	1,710.50
Moving of scale house at the N Street trestle completed by day labor	784.29
Spot painting of girders on the Anacostia Bridge completed by day labor	296.61
Construction of two clearance gauges at the Highway Bridge commenced, one gauge completed by day labor	471.91
Grading approach to scale house at the N Street trestle completed by day labor	62.40
Alteration to revetment wall at Wharf No. 6, Water Street between M and N Streets SW	87.50
Construction of concrete retaining wall on Canal Road west of the Aqueduct Bridge completed under contract with the Warren F. Brenizer Co.	48,663.59
Contract completed with the Miller & Dorsey Co. for driving and capping bearing piles and dredging at Wharf No. 6	11,486.82
Contract with Royal J. Mansfield for the construction of new roadway floor on the Calvert Street Bridge	[1] 17,798.00
Contract with the Cambridge Manufacturing Co. for construction of reinforced-concrete wharf decks at Wharf No. 6	[1] 14,260.00
Contract with the Allen H. Rogers Co. for construction of 9 reinforced-concrete stalls at the N Street trestle	[1] 9,643.50
Contract with Royal J. Mansfield for the construction of 12 concrete bins at the N Street trestle	[1] 14,984.00

[1] The work is in progress

ENGINEER STABLES.

The engineer stables, housing 60 horses and 22 mules, are located at U Street NW. between Sixteenth and Seventeenth Streets, and First and Canal Streets SW. The animals are assigned to the various departments as follows:

Sewer division	30
Repair shop	22
Repairs to cuts	22
Surface division	5
Sealer weights and measures	1
District surveyor	1
Electrical department	1

Number of annual employees: 1 superintendent, 1 blacksmith, 2 drivers, 2 watchmen.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

Very respectfully,

C. B. HUNT,
Engineer of Highways.

ASSISTANT TO THE ENGINEER COMMISSIONER.

TABLES B AND C.—*Character and extent of roadway pavements July 1, 1922.*

SQUARE YARDS.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete.	Durax block (small granite block).	Granite and rubble.
Northwest	1,817,663	25,323	9,674	6,372	20,999	12,294	96,627
Northeast	406,794	193,962	3,127	.....	11,825	.....	18,289
Southeast	262,954	238,437	8,019	4,082	1,324	.....	37,199
Southwest	286,102	40,436	13,535	.....	11,148	.....	149,638
Georgetown	156,171	23,076	4,144	905	.....	5,674	30,492
Northwest suburban	389,138	84,046	25,855	36,680	172,150	.....	23,945
Northeast suburban	82,372	6,925	14,354	.....	31,326	.....	.....
Southeast suburban	21,203	.....	.....	3,049	12,933	.....	1,000
Total	3,422,397	612,205	78,708	51,088	261,705	17,968	357,190

Section.	Vitrified block.	Cobble.	Macadam (estimated).	Gutters on asphalt streets.	Gutters on asphaltic concrete streets.	Pavements maintained by street railroads.	Total.
Northwest	9,855	5,763	22,517	119,518	1,128	287,110	2,434,843
Northeast	3,882	.....	30,416	32,379	231	69,316	770,221
Southeast	.....	13,122	45,465	18,316	898	48,328	678,144
Southwest	3,138	7,070	10,136	24,527	1,254	56,820	603,804
Georgetown	515	10,419	3,000	5,979	498	31,816	272,689
Northwest suburban	.....	.....	1,303,633	28,496	5,871	54,765	2,124,579
Northeast suburban	.....	.....	385,481	5,764	1,049	9,000	536,271
Southeast suburban	.....	.....	73,662	6,385	272	7,370	125,874
Total	17,390	36,374	1,874,310	241,364	11,201	564,525	7,546,425

TABLES B AND C.—*Character and extent of roadway pavementi July 1, 1922*—Contd.

MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone. base.	Cement concrete.	Durax block (small granite block).
Northwest	93.42	1.57	0.51	0.24	1.15	0.3[illegible]
Northeast	21.38	8.58	.19	.....	.80	.....
Southeast	13.93	11.93	.43	.17	.09	.....
Southwest	15.51	2.37	.68	.....	.36	.....
Georgetown	9.30	1.51	.49	.06	.....	.2[illegible]
Northwest suburban	21.69	4.52	1.31	2.00	9.37	.....
Northeast suburban	5.15	.63	.97	.....	1.79	.....
Southeast suburban	1.83	.....	.....	.21	.51	.....
Total	182.21	31.11	4.58	2.68	14.07	.5[illegible]

Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unimproved (estimated).	Total.
Northwest	5.45	0.50	0.08	1.00	2.54	106.76
Northeast	.91	.24	.....	1.60	4.36	38.0[illegible]
Southeast	2.14	.....	.66	2.15	6.40	37.90
Southwest	7.75	.27	.30	.49	2.62	30.3[illegible]
Georgetown	2.12	.03	.48	.06	.76	15.0[illegible]
Northwest suburban	1.13	.....	.....	81.97	52.67	174.6[illegible]
Northeast suburban	.....	.....	.....	27.63	43.39	79.5[illegible]
Southeast suburban	.04	.....	.....	5.68	36.60	44.8[illegible]
Total	19.54	1.04	1.52	120.58	149.34	527.24

TABLE O.—*Number of square yards and cost of repairs to cuts in various streets, sidewalks, and alleys during the fiscal year ending June 30, 1922, chargeable to plumbers, public service corporations, individual depositors, and appropriations of the District and Federal Governments.*

	Flat rate.	Whole cost.	Total.
Plumbers	$19,732.11	.....	$19,732.11
Public service corporations	49,749.88	$150,616.35	200,366.23
Individual depositors	13,510.79	.....	13,510.79
Various appropriations of the District and Federal Governments	40,041.41	46,956.84	86,998.25
	123,034.19	197,573.19	320,607.38

	Flat rate.	Whole cost.
Square yards repaired:		
Sheet asphalt	$4,081.95	$7,081.44
Vitrified block	1,168.44	7,629.02
Asphalt block	2,018.75	8,768.00
Granite block	883.25	3,126.40
Cobble	235.11	869.64
Cement sidewalks	11,347.81	.....
Brick sidewalks	[1] 3,642.00	8,791.60
Macadam	2,582.58	4,799.64
Durax block	24.55	6,031.20
Scoria block	26.81	1,232.36
Concrete roadways	3,678.87	.....

[1] Square feet.

REPORT OF THE INSPECTOR OF ASPHALTS AND CEMENTS.

SEPTEMBER 1, 1922.

SIR: I have the honor to submit the following report showing the operations of this division during the fiscal year ended June 30, 1922.

The volume of work of the division during the year represented by the number of tests made show a total number of 10,306 samples submitted which were analyzed, tested, and examined.

There were also a number of miscellaneous laboratory tests made on Portland cement, asphalt cement, sand and gravel, prepared in connection with special experiments conducted under your personal supervision.

ASPHALT PAVEMENTS.

During the year there were laid by the Cranford Paving Co. and Corson & Gruman Co., contractors for the laying of new and resurfacing asphalt pavements, approximately 75,463.57 square yards, in which Aztec and Standard asphalts were used.

The municipal asphalt plant produced about 209,352 cubic feet of old material and topping mixtures, used in the patching and repairs to asphalt pavements in which Standard asphalt was used.

PORTLAND CEMENT.

The testing of 8,222 samples represent 82,243 barrels, with no rejections.

Results of tests and by whom submitted are shown in Tables Nos. 7 and 8, on file in this office.

The work of this office has been kept current and is current to date.

Very respectfully,

J. W. DARE,
Inspector of Asphalts and Cements.

ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS.

WASHINGTON, D. C., *August 15, 1922.*

SIR: I have the honor to submit my annual report dealing with the operations of the trees and parkings office for the fiscal year ended June 30, 1922.

TREES PLANTED.

Two thousand three hundred and forty-seven young trees were planted in their permanent position on the streets during the fiscal year, 108 less than the number planted the previous year. Almost all of the trees planted were for the purpose of filling vacancies in existing rows in the Northwest and Southwest sections of the city. Of the number planted, 2,342 were set at the curb line, 3 in the parking between the inner edge of the sidewalk and the building line, 1 at the public comfort station, Fifteenth Street and Maryland Avenue NE., and 1 in the central parking, Fourteenth Street NW., between Montague Street and Park Place. The work of preparing

the tree spaces during the fiscal year was performed at various times between October 11, 1921, and April 19, 1922, some time being lost between these dates due to the unusually severe weather in the winter. The planting of the trees in these spaces was undertaken last spring. The planting of trees continues to be a costly item in view of the existing high price of labor and materials of all kinds and the long hauls to dumps. The cost of planting 2,307 was paid for from the appropriation for the parking commission, 29 from appropriations for other departments, and 11 from whole-cost deposits. The sum of $9,616.88 was expended from the appropriation for the purchase of material for tree boxes, straps, stakes, etc., lifting trees in the nursery for street planting, making boxes, digging tree holes, planting trees, and cost of soil.

TREES REMOVED.

Hundreds of trees die annually because of injuries over which this department has no control. In addition to natural enemies, the unfavorable city conditions make the life of a street tree a hard one. The chief sources of injury to shade trees are the generally poor conditions of the soil along the streets, which is continually being impoverished by the growing trees, and our inability to fertilize them because of the cement walks and pavements. During the year 262 old silver maple trees were removed from both sides of H Street NE., between Second and Fifteenth Streets, and the same were replaced with 174 Norway maples. In connection with street improvements it was necessary to remove 14 silver maples and 1 Norway maple from the north side of U Street SE., between Fourteenth and Fifteenth Streets, and the same were replaced with 13 Norway maple trees, and 9 silver maple trees were removed on the north side of Pleasant Street SE., between Nichols Avenue and Thirteenth Street, and replaced with 15 Norway maples. A total of 2,518 trees were removed during the fiscal year for various reasons.

Of the 2,518 trees removed during the year, 262 were decayed and dangerous; 237 were of inferior and condemned varieties; 8, to relieve excessive shade; 108, street improvements; 13 for driveways; 1 for vault; 14, improvements to alleys; 49, accidents; 90, storms; 25, close proximity to buildings; 10, interference with building operations; 5, interference with traffic; 1, interference with a lamp; 1, injurious to private property; 33, injurious to curb trees; and 27 interfered with the construction of sewer. It was ascertained that 26 trees were destroyed by illuminating gas, 95 by salt water, 353 by abnormal moisture supply, 109 by being filled around, 16 by being girdled, 109 by drought, 1 by insects, 112 by root mutilation, 6 by oil, 7 by sewer gas, 9 by being overshadowed, 18 by horse bite, 3 by frost, and the deaths of 770 were unexplained.

Of the number removed, 2,256 stood at the curb line, 154 in the parkings, 46 in the sidewalk, 7 in alleys, 23 in the roadways, and 32 in playgrounds.

The cost of removing 2,333 trees was paid for from the appropriation for the parking commission, 155 from the appropriations for other departments, and 30 from whole-cost deposits. The cost of removing the trees paid from the appropriation for the parking commission was performed at a total cost of $4,879.55.

TREES SPRAYED.

Street trees, like all other forms of vegetation, are subject to ttack of insects and diseases. It was necessary to spray the trees or the destruction of leaf-eating insects during the year, and as a esult 37,990 trees were sprayed for the extermination of the elm-leaf eetle, tussock moth, and the fall webworm. This office was unable o treat the trees during the winter with lime-sulphur solution for he destruction of scale insects, due to the limited appropriation vailable to plant and care for the shade trees of this city. The work of spraying the trees was performed at a total cost of $2,301.01.

NURSERIES.

This department is still occupying the ground at Fort Dupont for the propagation of trees for street planting, and while the soil is well adapted for tree nursery purposes there is not a sufficient amount of ground available in this tract to grow the total number of trees necessary to keep up with the rapid growth of the city, even if adequate funds are provided. The total number of seedlings transferred from the seed beds to the nursery rows last spring was 4,526, and of this number 1,535 were Norway maples, 542 red maples, 828 red oaks, 1,393 pin oaks, and 228 elms. These trees will be available to plant to their permanent position on the streets in the next five years. At the end of the fiscal year there were 4,783 trees planted in the nursery rows at Fort Dupont nursery.

TRIMMING.

No systematic trimming was undertaken during the year, but to offset this a great many individual requests for trimming trees, removing objectionable limbs, etc., were given attention. In executing orders for work of this nature in compliance with requests many trees in the immediate vicinity were trimmed. There are a great many old silver maple trees in the down-town section of the city, and they should all be removed and replaced with better varieties. This work can not be undertaken with the present limited appropriation without neglecting other important work. The silver maples are fast deteriorating, and as a matter of safety to the public many of them should be severely trimmed, topped off, etc. This treatment will improve their general appearance and prolong their life for a short period. A total of 8,796 trees were trimmed during the year at a total cost of $3,519.90.

It is the intention to undertake the systematic trimming of all the trees on the streets in the northwest section of the city, starting west of Eighteenth Street and south of Florida Avenue, as soon as practicable after the beginning of the fiscal year 1923, and continue this work until it has to be discontinued for other more urgent work.

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES.

The usual amount of cultivation of young trees was performed during the year. This work is absolutely necessary to insure good growth in young specimens, allowing them to derive the fullest benefit from rainfall.

Too much stress can not be laid upon the importance of cultivation, the full value of which is not appreciated. This cultivation is not only beneficial to the young trees, but also destroys a rank growth of weeds that would otherwise spring up around them, and the same would be unsightly. The keeping of the soil around trees cultivated and free from weeds is one of the most important aids to their growth, and also allows air to reach the roots, renders more available the plant food the soil contains, and also prevents the rapid evaporation of moisture. A total of 18,847 trees were cultivated during the year at a total cost of $2,839.74.

Many uninclosed public parkings were mowed during the year, the necessity being recognized to rid the city of as many weeds as possible. This work was performed between July 1 and October 18, 1921, and from August 20 to October 18, 1921, a majority of the outside employees were engaged on this work. The mowing last year was performed at a total cost of $3,203.64.

In addition to the removal of the weeds along the streets this office mowed the grass at various times on the lawn in front of the District Building and the park in front of the Center Market at Seventh Street and Pennsylvania Avenue NW.

During the fiscal year 1,426 old wooden tree boxes and 165 iron tree guards were removed, as the trees were large enough to do without their support. Many of the wooden boxes were in a dilapidated condition and they gave the street an unsightly appearance.

PAVING OF ABANDONED TREE SPACES.

The work of paving abandoned tree spaces throughout the city was not undertaken very extensively during the year. This work is performed by the Surface Division, Engineer Department, and the cost of the same is paid from the appropriation for the Parking Commission. A total of $133.54 was spent on this work.

REGULATION OF TERRACES.

The regulation of terraces throughout the city is proceeding satisfactorily and in the recently built up sections of the city the uniformity in their heights presents a pleasing appearance. This office examined and issued 1,375 permits affecting the grade of terraces in connection with building operations during the year. There was a very noticeable increase in the number of permits issued during the year over several previous years.

GENERAL COMMENT.

I wish to call attention to a few facts about the trees of Washington. Shade trees are living, breathing things, and on the streets are expected to grow, thrive, and be kept free from insects, when everything but what nature intended is present to prevent their proper development; cement walks which keep out the water, gas leaks to poison the soil, and other injurious factors, all militating against their proper and permanent growth.

In the largest tree city in the world, which we have the honor of living in, we will necessarily have more insects than other municipalities, as they are always present on trees to a certain extent.

Spraying, which is carried on with great difficulty, due to traffic and the danger of defacing private property, does not kill by contact, but is a stomach poison, and it is almost impossible to poison every leaf on every tree. We should be thankful if we can keep the trees in foliage during the hottest months of summer. When spraying is necessary, all trees need it at the same time, and with a row of 500 miles of shade trees and horse-drawn sprayers it is a three months' job.

With an appropriation smaller than pre-war, and wages a hundred per cent greater, it can readily be seen that if the city is to grow more money is necessary to keep up with the extensions. Surely the tree system of Washington should not be extended when by so doing the fine rows of existing trees must be neglected. Ever mindful of the need for economy, I believe that, until Congress in its wisdom sees fit to increase the appropriations for this department, we should take care of what we have to the best of our ability. The money available is not enough to properly care for the existing trees, but in the future, as in the past, everything possible will be done to preserve the trees, with the realization that many people will be disappointed because their trees are not given more attention, but as they are not in the position to observe all the trees, they must understand that the department will do those things first that are deemed urgent.

SUMMARY.

Curb trees on streets at close of fiscal year 1921	105,803
Net increase of curb trees during fiscal year 1922	86
Curb trees on streets at close of fiscal year	105,889

Very respectfully,

C. LANHAM,
Superintendent of Trees and Parkings.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE CITY REFUSE DIVISION.

WASHINGTON, D. C., *July 31, 1922.*

SIR: I have the honor to submit the following report of the work done by the city refuse division, engineer department, for the fiscal year ended June 30, 1922.

Eight hundred thousand dollars was appropriated for the collection and disposal of garbage, ashes, and miscellaneous refuse, and $375,000 for dust prevention, cleaning of streets and alleys, and snow removal. Because of the exceptionally heavy snowfall in the last days of January, necessitating extraordinary expenditure for its removal, an additional sum of $30,000 was appropriated by the Congress to cover this cost.

SNOW REMOVAL.

This snow clearly indicated that the equipment available for such work was entirely inadequate. To cover this deficiency, trucks, plows, and tractors have been purchased with which to keep the streets *open for travel in future* snowfalls.

STREET AND ALLEY CLEANING.

Tables are appended which show the yardage cleaned by the several different methods and the cost of each. It is interesting to note that the unit costs per thousand square yards have returned to about pre-war costs.

An innovation this year was the use of motor-driven sweepers. The cleaning was done in this way at a cost considerably less than by horse-drawn machines.

As in the two previous years the refuse from Center, Western, and Eastern Markets was collected and disposed of as a street-cleaning function at a cost of $992.20.

GARBAGE COLLECTION AND DISPOSAL.

The amount of garbage collected was over 15 per cent greater than in the previous year, a total this year of 69,452 tons. This collction cost $233,640.60.

The cost of disposal of this garbage was $154,799.62. The revenue derived from grease sold was $121,532.07. In addition to the grease some 9,000 tons of press cake were produced, but because of prevailing low prices only 200 tons of this were converted into tankage and sold.

After deducting the cost of drying, grinding, and screening, this press cake has a net value of about $3 a ton, so that notwithstanding low prices the cost of disposal of the city's garbage (included in which is the expense of freight from Washington to the reduction plant at Cherry Hill) was but slightly over $5,000.

ASHES.

Because of the cold winter, the quantity of ashes collected and disposed of was greater than usual, amounting to 156,100 cubic yards.

These ashes were deposited in low ground in various sections of the District, but it is to be noted that such places are increasingly difficult to obtain, and the haul each year is becoming longer.

MISCELLANEOUS REFUSE.

The cost of the collection and disposal of miscellaneous refuse from householders was $194,805.64, but there was salvaged and sold sundry material to the value of $67,458.68, so that the net expense of this work was $127,346.96. The plant of the former contractor for this work, located at Mount Olivet Road and Montello Avenue, was leased and used in this salvaging process.

GENERAL.

On April 1, 1922, a new scale of wages became effective reducing those employees receiving less than $3.36 per day by 8 cents, those receiving between $3.36 per day and $5.36 per day by 16 cents, and those receiving over $5.36 per day by 24 cents. The prevailing rate of pay for unskilled laborers is $2.72 per day, drivers $2.88 per day, and garbage collectors $3.28 per day.

As previously indicated, the amount of refuse to be collected is increasing materially, and whatever accumulates must be disposed of. Rows of new houses are being built, many of them in the suburbs, so that the average haul is constantly becoming longer. As stated in my last annual report, new equipment, repairs to plant, and added facilities not permitted by previous appropriations are absolutely necessary.

For the work accomplished during the past year, my acknowledgments are due the employees of this division.

Very respectfully,

MORRIS HACKER,
Supervisor City Refuse.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Cost of street cleaning July 1, 1921, to June 30, 1922.

	Area (square yards).	Cost.	
		Amount.	Unit per M.
Machine cleaning, motor	45,140,000	$9,974.13	$0.221
Machine cleaning, horse	66,194,000	20,337.33	.307
Alley cleaning	57,288,000	35,171.92	.614
Suburban cleaning	50,221,000	19,887.76	.395
Hand patrol	1,357,169,000	208,573.06	.154
Motor flushing	48,223,000	6,498.78	.135
Squeegeeing	94,650,000	14,286.34	.151
Sprinkling		3,825.67	
Dumpmen		3,479.35	
Property accounting		2,104.73	
Waste-paper boxes		2,248.75	
Snow and ice		34,646.38	
Annual overhead		2,452.03	
Sunday cleaning		2,091.91	
Total		365,578.14	

Yearly cost of cleaning by various methods.

Class of work.	Average thousand yards under attention.	Total cost.	Average cost for each thousand yards under attention for year.	Thousand yards cleaned.	Average number of cleanings for year.
Hand patrol [1]	5,020	$208,573.06	$39.50	1,357,169	272
Machine cleaning, horse	444	20,337.33	45.80	66,194	149
Machine cleaning, motor	394	9,974.13	25.25	45,140	115
Alley cleaning	1,205	35,171.92	29.20	57,288	48
Suburban streets	2,089	19,887.76	9.52	50,221	24
Squeegeeing	1,193	14,286.34	11.97	94,650	79
Motor flushing	860	6,498.78	7.55	48,223	56

[1] Hand patrol work is habitually in combination with squeegeeing and flushing.

Comparative data in connection with street-cleaning work, 1918 to 1922.

SQUARE YARDS CLEANED.

	1918	1919	1920	1921	1922
Hand patrol	879,574,000	748,142,000	1,173,802,000	1,323,163,000	1,357,16
Machine, horse	205,504,000	218,682,000	98,350,000	119,256,000	66,19
Machine, motor					45,24
Alley cleaning	49,878,000	57,208,000	55,344,000	69,090,000	57,28
Suburban streets	38,393,000	32,876,000	34,550,000	60,382,000	50,22
Squeegeeing	125,520,000	89,868,000	111,008,000	127,596,000	94,63
Flushing	16,776,000	5,539,000	24,433,000	40,842,000	48,22
Motor flushing	12,621,000	12,213,000			

DIRECT TOTAL COST.

	1918	1919	1920	1921	1922
Hand patrol	$165,521.33	$195,665.33	$237,490.76	$253,485.93	$208,57
Machine, horse	49,242.68	77,555.50	40,915.64	48,237.93	20,33
Machine, motor					9,97
Alley cleaning	30,018.51	45,118.53	44,239.33	45,696.39	35,17
Suburban streets	18,986.48	20,540.42	24,231.40	33,372.65	19,88
Squeegeeing	21,141.04	20,929.32	24,743.81	27,684.70	14,28
Flushing	7,566.84	2,757.63	6,835.91	7,424.31	6,49
Motor flushing	3,964.29	4,418.61			

COST PER 1,000 SQUARE YARDS.

	1918	1919	1920	1921	1922
Hand patrol	$0.189	$0.261	$0.202	$0.192	$0
Machine, horse	.239	.354	.416	.404	
Machine, motor					
Alley cleaning	.603	.789	.800	.661	
Suburban streets		.625	.702	.549	
Squeegeeing	.168	.233	.223	.217	
Flushing	.450	.497	.279	.182	
Motor flushing	.314	.361			

Total cost of street cleaning, including all charges, except interest on investment and depreciation $365,57
Population served 437,
Cost per capita per year ..... $0.

Table showing comparative data in connection with disposal of all city wastes from 1918 to 1922.

NUMBER OF UNITS COLLECTED.

	1918	1919	1920	1921	1922
Garbage ..... tons	48,874	53,258	52,793	60,058	69,
Ashes ..... cubic yards	127,363	134,673	148,228	135,940	156,
Miscellaneous refuse ..... do	163,291	149,650	170,286	148,908	196,
Night soil ..... barrels	11,300	11,111	12,734	12,507	14,
Dead animals ..... number	22,891	19,974	19,995	24,704	28,

TOTAL NET COST.

	1918	1919	1920	1921	1922
Garbage	$69,290.00	$207,662.54	$178,311.57	$283,406.63	$210,26
Ashes	68,922.64	100,300.00	114,248.38	116,421.04	135,26
Miscellaneous refuse	26,318.75	51,204.00	46,522.26	66,029.59	107,43
Night soil	14,998.00	17,500.00	17,500.00	17,500.00	17,50
Dead animals	2,988.00	3,360.00	3,360.00	3,360.00	3,36

MISCELLANEOUS DATA ON CONTRACTS.

Class of waste.	Contractor.	Period of contract.	Date of expiration.	Price per annum.	Collected from—
Dead animals	Chas. F. Mann	5 years	June 30, 1923	$3,360	Every part of the District
Night soil	Warner Stutler	do	do	17,500	All privies in the District

REPORT OF THE MUNICIPAL GARAGE.

WASHINGTON, D. C., *August 18, 1922.*

SIR: I have the honor to submit the following report on the municipal garage for the fiscal year ended June 30, 1922.

For necessary transportation the garage was kept open at all times, night and day, for urgent and necessary transportation.

The labor and mechanical force consisted of eight men whose duties were repair work of all kinds, carrying the District government mail from the city post office to the District Building, and driving for the different departments which have no drivers assigned to them.

There were 44 automobiles maintained and kept in running order for the various departments of the District government. All machines washed and supplied with oil and gasoline by the night force.

The total cost for maintenance and repairs of these cars, including gasoline, oil, tires, miscellaneous supplies and labor amounted to $18,500.67; average cost per mile was $0.0532.

The total cost of repair parts was $2,255.62, an average of $51.26 per car, and an average of $0.00752 per mile. The average mileage per car was 5,417 miles.

Owing to the crowded condition of the municipal garage it is recommended that immediate action be taken for the relief of this congestion.

The garage was constructed during the year 1917 for the maintenance of approximately 25 cars, sufficient floor space being allowed for the necessary repair work and cleaning of these cars. Additional cars purchased during the last five years have increased the number of cars at the garage to 44, which necessitates the storing of cars overnight in the aisles; of this number 7 are being stored at different places in the city, which is objectionable to the other departments housing these cars overnight. The conditions at the garage make it very difficult for the night men to wash and supply gasoline to the cars.

Very respectfully,

E. P. BROOKE,
In charge.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF ASSISTANT ENGINEER COMMISSIONER BROWN.

WASHINGTON, D. C., *September 15, 1922.*

SIR: I have the honor to transmit herewith the annual reports of the operations of the various divisions and offices under may immediate supervision for the fiscal year ended June 30, 1922.

Very respectfully,

CAREY H. BROWN,
Major, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.

The ENGINEER COMMISSIONER.

REPORT OF THE SURVEYOR.

WASHINGTON, *September 8, 1922.*

SIR: The report on the work of this office for the year ended June 30, 1922 is hereby submitted for the information of the commissioners. This report also includes the condemnation of streets, parks, and alleys.

This work may be divided into three parts. First, work for private parties, for which a fee is charged. This fee is fixed by an order of the commissioners. Second, work for the various departments of the District and Federal Governments, for which no fee is charged. Third, survey, preparation, and report for all condemnation cases for streets, alleys, and parks.

Much of the time of the office force is taken up waiting on the public and answering inquiries.

Work done for private parties, for which a fee is charged, has greatly increased over any previous year. The estimates made for work well illustrate the growth of the office by a comparison of the past three years. Orders for work in 1920 were 5,795; 1921 were 8,450; while 1922 shows the unprecendented number of 11,320. This is an average of about 36 orders for work per day. This great increase in the volume is also shown by the cash receipts—1921 receipts were $25,355.82 while this year they amounted to $40,503.80. This is in excess of the appropriation allowed for this office by over $7,000. While the office has been more than self-sustaining it has never been held that it should be self-sustaining for the reason that so much of the force is engaged in work for the various Government departments and in serving the public.

This increased amount of work has placed more work upon the office force than they have been able to do promptly and much more than the force is capable of doing efficiently. This work is paid for by the public and they demand prompt service and this can not be done with the present volume of work and the inadequate force.

More new lots have been created, more inspection of walls being erected, and more maps have been drawn than in any previous year in the history of the office. This increased volume of work is largely due to the great building boom that is now on in Washington.

The following table is submitted for your information and will give you a comparison of the work during the year just closed with that of the previous year:

	Fiscal year 1920-21.	Fiscal year 1921-22.
FOR PRIVATE PARTIES.		
Individual lots or parts of lots surveyed in city and county	3,043	5,043
Certificates of survey issued covering one or more lots	1,645	2,227
Duplicates of above recorded in survey certificate books	1,645	2,227
Separate surveys made to verify walls	1,084	1,700
Postal-card reports concerning walls issued to owners	1,084	1,700
Individual buildings inspected as to location of walls	1,268	3,022
Large tracts in county surveyed, subdivided, and recorded	25	21
Outline surveys in county of unsubdivided tracts	163	78
Subdivision plats prepared in duplicate	228	532
Duplicate subdivisions prepared for assessor	228	532
Subdivisions recorded	212	470
Total of individual new lots in subdivisions	2,814	3,878
Plats of one or more recorded lots to accompany applications for building permits (commonly called "building plats"), in duplicate	3,427	5,648

	Fiscal year 1920-21.	Fiscal year 1921-22.
FOR PRIVATE PARTIES—continued.		
ats made up under regulations for theaters, garages, etc	157	152
timates of cost issued in triplicate	8,450	11,320
ats made up on order of private parties	5,645	8,658
tal of fees paid to collector of taxes by private parties	$25,355.82	$40,503.80
FOR THE DISTRICT OF COLUMBIA.		
rveys made for the District of Columbia	207	109
ats recorded (condemnations, dedications, etc.)	54	69
ports concerning walls to building inspector	1,084	1,700
essment and taxation plats recorded	392	415
MISCELLANEOUS.		
tal of surveys for the District of Columbia and private parties	3,124	4,135
tal of plats, public and private, including plats drawn in books	8,204	12,100

CONDEMNATION OF STREETS, PARKS, AND ALLEYS.

During the past year 46 condemnation cases have been before the ourts, divided into 26 street and building restriction line cases, 8 ark cases, and 12 alley cases.

The amount awarded as damages for the opening of streets and stablishing building restriction lines, and the acquisition of parks, as $127,641.94, and the total amount of damages for alleys $7,715.42, aking a total for all condemnation cases of $135,357.36. The umber of street, park, and building restriction line cases not yet led in court were nine, and seven alley cases.

Some of the more important cases now in court are (1) the opening f all streets in Barry Farm west of Nichols Avenue; (2) the opening f Webster, Allison, and Buchanan Streets and Arkansas Avenue; 3) the opening of Western Avenue between Massachusetts and Wisonsin Avenues; (4) and the widening of Southern Avenue between onini Road and Livingston Road.

This office has completed the work necessary for the condemnation f the balance of all the streets in Barry Farm. This, in connection ith the condemnation of streets west of Nichols Avenue constitutes he largest individual case for the opening of streets this office has ver submitted to the corporation counsel for condemnation. When he balance of these streets have finally been acquired, it will complete project which this office has worked upon for many years, and it is hought will prove of great benefit to this large area, which has been vithout public streets and other improvements, such as water, sewer, idewalks, etc., since about 1874.

One of the larger projects being prepared by this office for condemnation will be an attempt to widen Canal Street from Thirty-sixth nd M Streets, Georgetown, to the Conduit Road. This street is ery narrow and badly congested, and it is hoped a way can be rovided for its widening.

Survey has about been completed for the widening of Broad Branch Road from the District line to Rock Creek Park. This will pen up a beautiful territory and provide better facilities for traffic here it is much needed.

The office is also engaged in a survey preparatory to the widening f Benning Road from Anacostia Avenue (Bennings) to the District

line. It is believed that this should be condemned before improvements are constructed within the lines of the proposed street, and thus make its widening prohibitive.

A table showing the street, park, and alley cases pending, confirmed, and recommended by this office but not yet filed, is on file in this office.

PARKS.

The plan of the Federal city made by L'Enfant in 1791 provided for a comprehensive street plan and beautiful parks. Washington is justly famous for its wide streets and magnificent parks. Outside of what was the original Federal city, bounded by Florida Avenue (formerly Boundary Street), there was a very comprehensive street plan adopted in 1893. This plan, known as the highway plan, covers the entire District of Columbia. No land may be subdivided that does not conform to this plan, and the District therefore is being subdivided in a comprehensive and orderly manner; but there is no provision for a park plan that has any force of law, and any parks that are to be acquired can not be taken over without special legislation. If subdivisions of land are allowed to continue without any adequate provision for parks, the entire District of Columbia will be subdivided without any chance of securing the ground for this important movement. Much of the land at the present time is sparsely settled and comparatively cheap, which is now specially adapted for park purposes. These attractive spaces should be preserved so that the people can walk and ride through them and the children play in the open. There is nothing which will promote the health and happiness of the people of a city more than to have outdoor recreation and playgrounds. Many of the magnificent trees and beauty spots are being destroyed, and others will be destroyed with the rapid development of the District. The new Washington, being created beyond Florida Avenue, will not have the liberal park area provided in the old Washington. It is a reflection upon the present generation not to provide as beautiful a city as the designers of the old original city.

This office has from time to time recommended the acquisition of Piney Branch parkway, Klingle Road valley, and the Patterson tract for parks. The necessity for the acquisition of these areas requires little comment from me. They are beautifully situated and mostly covered with magnificent trees, and are ideal for park purposes. Improvements, however, are encroaching so rapidly upon Piney Branch parkway and Klingle Road valley that if some action is not taken at once to acquire them, they will be lost as parks. I know of no link in the chain of parks in the District of Columbia so important as the Klingle Road valley. This is at present covered with the most beautiful trees in the entire District; besides it will connect Potomac Park and the Mall on the south with Rock Creek Park on the north, without passing through the Zoological Park. This park of necessity must have traffic restrictions; besides it is a playground for children, and should not be open to the continuous line of automobile traffic. If this link is acquired, it will complete the park system from the extreme south end of Potomac Park to the north end of Rock Creek Park, which is the north end of the District, making one of the most beautiful chains of parks in any

city of the country. Buildings are fast being erected across this link, and I have no hesitancy in saying that if this is not acquired within a very short time it will be lost as a park.

The enactment of legislation for the acquisition of the Civil War forts and the fort drive connecting the fort sites, is a matter that should be seriously considered at this time. There are some 40 forts and batteries on the District side of the Potomac River which formed the defenses of Washington, and they are of historic interest. Some of them have been destroyed by the progress of improvements, while many of them remain. Their acquisition, with a connection by a fort drive, would form one of the most magnificent boulevards encircling the city on heights which would give a wonderful panoramic view of the city, the Potomac River, the Anacostia River, and the hills of Virginia. No drive could be constructed in the District which would have the historic and sentimental interest, and besides providing a beautiful boulevard that would connect all parts of the District. In this chain Fort Davis and Fort Dupont have already been acquired, but this is a very small beginning.

I wish to call your attention to a matter that seems to me could be developed into one of the most beneficial improvements without such a tremendous outlay of cost that I can think of. It relates to the parking in front of residences in the District. This applies especially within the limits of the original city. These park areas are publicly owned, yet they are for the sole use and benefit of the adjoining property owner, who pays no rent or taxes upon the park area he enjoys. It is my belief that these areas could be regulated and beautified so as to add to the beauty of the city to a great degree. Especially do I have in mind the development of Sixteenth Street. There is 40 feet of public parking along each side of Sixteenth Street. This is occupied by the property owners, without any regard as to uniformity of treatment. There are some places where it is terraced and other places where it is on the grade of the sidewalk. There are some with fences and some without, some with hedges and some without, creating the most hodge-podge development that is possible. I know of nothing that would beautify Sixteenth Street so much as to have on both sides of the street a beautiful 40-foot parkway. It seems unreasonable to think that the Government owns this park area, and yet makes no effort to beautify it.

There are many ways this might be accomplished. It is believed that it would require legislation, which should provide for part or all of the cost to be borne by the property owners. Certain major streets could be developed at first, and the development could extend as there arose a demand, or the public interests required it. It seems unfair for one neighbor to keep a beautiful front yard to be marred by another neighbor who has no pride in its upkeep.

It is recommended that the commissioners take this matter under consideration at the earliest practicable date.

ALLEYS.

The law known as "the alley law," which provides for the elimination of all alley dwellings has been extended until June 30, 1923. The law, in other words, requires the vacation of all alley dwellings in the District by that time. This law has been extended from time

to time on the ground that it would be a hardship to deprive these ten or fifteen thousand people of their homes during the abnormal times that we have passed through the past few years. The question now arises, will the conditions be better at the expiration of this term of extension? Will it be any easier for these poor people to find new homes within their means? This office has always been opposed to the extension of this law, but rather in favor of having the law fundamentally amended. It is believed that if enforced it would create a great hardship upon these people. The fact that they are there, in many cases, is because they are not able to occupy better homes. This fact, however, will not shelter them after the expiration of this extension. I am not advocating that the alley dwellings should not be closed, but rather that the law be amended in many respects. These alley dwellings constitute a menace to the health and morals of the community and have been tolerated too long. They are breeding places for vice and crime, and provide hiding places for the "bootlegger." Perhaps 80 per cent of these alleys could be opened into minor streets, running through from street to street, and providing ample street facilities and ground at reasonable prices for the erection of small houses.

There are many other amendments to the law which, in the judgment of this office, might be made to an advantage.

The appropriation of $1,000 for the purchase or condemnation of alleys or minor streets has been used to good advantage in the purchase of cut-offs where alleys were found too narrow to accommodate traffic. This also will be continued as such cases are brought to the attention of this office.

PERMANENT SYSTEM OF HIGHWAYS.

The $2,000 appropriated for marking permanently upon the ground the highway plan for the District of Columbia has been expended in connection with locating many of the highway streets upon the ground and marking the same permanently. About 300 stone monuments about 3 feet long have been planted at various block corners. This will assist in making surveys in cases where these monuments have been planted.

This work will be carried on as the appropriation becomes available.

SALARIES.

I wish again to emphasize, with as much force as possible, the importance of not only increasing the number of employees of this office, but increasing the pay of the men. There are chainmen doing very accurate and responsible work in this office getting as low as $650 per annum, basic pay. It is difficult to understand how we are able to get men at all at such a rate of pay. It is impossible to secure experienced men, and the responsibility of this work is such that only experienced and competent men should be employed. As previously stated in this report the work has so greatly increased that it is impossible to render prompt and efficient service with the present force.

I wish to call your attention to the appropriation of $7,000 for the *per diem* employees in this office. In accordance with instructions

from Major Brown, with the approval of the engineer commissioner, the present force was retained after the 1st of July, with the information that the appropriation would only carry the force for about seven months of the present fiscal year. This was done with the understanding that effort would be made to provide a deficiency appropriation. I wish to state that if this policy is pursued, and the appropriation should not be secured, it would be a very serious matter for a number of the employees paid from that appropriation. Some of these men have been in this office over 25 years, have given their life to this work, and know no other, and it would be a very serious matter to them, and at the same time the public could not be served. I wish to go on record in this matter.

There has been no increase in the number of employees in this office for over 15 years, and with the great increase of work it makes it absolutely impossible to take up work incident to the proper development of the street, park, and alley plans for the District.

I wish to acknowledge the credit due the older men of this office for the service they are rendering. They have become efficient in their line of work, and should be rewarded. Over 50 per cent of the employees of this office are drawing less than $1,000 per annum, and I do not believe there is another department in the District or Federal Government whose level of pay is as low as it is in this office. We were instructed to recommend a scale of wages for the employees of this office for the fiscal year ending June 30, 1924, and those instructions were carried out; but it is believed in many cases it is not enough for some of the men who are engaged in the more responsible and technical work of this office.

Very respectfully,

MELVIN C. HAZEN,
Surveyor, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE MUNICIPAL ARCHITECT.

WASHINGTON, *August 15, 1922.*

SIR: I have the honor to submit the thirteenth annual report of the office of the municipal architect for the fiscal year ended June 30, 1922.

The work of the municipal architect's office consists in the preparation of plans and specifications and general superintendence and inspection of the erection and repair of all municipal buildings, embracing schools, police stations, truck and engine houses, hospitals, public-convenience stations, and various municipal institutions.

The activities of the municipal architect's office are divided into three groups: The central office and drafting room, the repair shop, and the branch office at the workhouse and reformatory.

The central organization consists of a drafting force under the direction of technical assistants experienced in design, construction, and mechanical work. In addition to the work on all new buildings, this organization prepares plans and specifications for the remodeling and repair of existing buildings.

The repair shop consists of a supervisory and clerical force together with a working force composed of artisans in the various building trades. The function of this shop is to maintain the various municipally owned buildings in a first class state of repair.

The branch office at the workhouse and reformatory is under the immediate supervision of a constructing engineer, and the details of the operation of this office may be found in his report.

I wish to emphasize that the appropriation for the repairs to school buildings is inadequate. Many of the older buildings require new heating plants and painting, while others should be equipped with modern lighting facilities. With the appropriation for the last fiscal year, it was possible only to make urgent repairs.

As a rule, new construction and remodeling or alteration of old buildings, are done by contract, the principal exception being the new buildings at Lorton and Occoquan, Va., where considerable prison labor is utilized, supplemented by such additional skilled employees as are needed to direct and instruct the prisoners to advantage.

In June, 1921, Congress, recognizing the importance of relieving the congestion in the schools, appropriated $1,544,000 for the erection of nine additional graded schools and two junior high schools, as well as for the purchase of certain school sites.

Because of the crowded condition of the schools, it was desired, if possible, to have these new buildings ready for occupancy by September, 1922. Owing to the inadequate force in the municipal architect's office to cope with this amount of work as well as the work that had to be done in connection with the construction of the Gallinger Hospital, the New Eastern High School, and other projects, it was necessary to engage the services of outside architects to prepare sketches and working drawings of the proposed school buildings, and the following architects were employed:

A. P. Clark, jr., Wheatley School; Donn & Deming, L. P. Wheat, Bell School; W. H. Fleming, Smothers School; Gregg & Leisenring, Buchanan School; Arthur B. Heaton, Eaton School; McNaughton & Robinson, Lincoln Park School; Murphy & Olmstead, Deanwood School; Delos Smith, Monroe School; Upman & Adams, Mott School.

These architects prepared only the structural plans and specifications. The plans and specifications for the heating and ventilating, plumbing and electrical work were prepared by the municipal architect, inspector of plumbing, and electrical engineer, respectively.

On November 8, 1921, a 4-room addition to the Monroe School was placed under contract. The remaining buildings authorized by this emergency legislation followed in rapid succession, with the exception of the Bell and Smothers Schools.

Owing to a change in the location of the Bell School, this building was not placed under contract until May 19, 1922.

With reference to the Smothers School, it was found upon opening proposals, that the lowest bid exceeded the appropriation and the project has been laid aside temporarily. Owing to the inaccessibility of the site, and the difficulty that would probably be experienced in getting supplies and mechanics to go so far out in the country when plenty of work was available in the city, the contractors were not willing to submit proposals on this building at the same cost as the schools previously contracted for within the city.

The price for most of the work done under the emergency appropriation averages about 34.9 cents per cubic foot. The Smothers School would have cost, on the basis of the bids submitted, 45 cents per cubic foot. Fortunately, the commissioners are authorized to treat the appropriations made under this emergency legislation as one fund, so that it may be possible to save sufficient money on other projects to enable the Smothers School to be placed under contract in the near future.

The building program, with respect to the graded schools, is now nearing completion, three schools have been accepted to date by the commissioners, namely, the Monroe, Deanwood, and Mott.

It is expected that practically all of the buildings now contracted for, with the exception of the Bell School, will be ready for occupancy at the opening of the school year. Considerable credit is due the various architects for the prompt and energetic manner in which the working drawings for the various schools were prepared, many of them setting aside all other work in their offices in order to expedite the school program so as to relieve the congestion in the schools at the earliest possible moment.

NEW CONSTRUCTION.

During the year the following buildings were under construction:

Gallinger Hospital, located on Massachusetts Avenue SE. between Nineteenth and Twentieth Streets. Contractual limit as fixed by Congress, $1,500,000. Amount appropriated to date, $1,500,000. Construction proceeded as follows: Psychopathic group of buildings: Contract executed September 24, 1920; completed December 15, 1921; cost, $802,855; contractor, George E. Wyne. Excavations, foundations, substructures, and pipe tunnels for power house and domestic building: Contract executed May 19, 1921; completed November 2, 1921; cost, $149,209; contractor, George E. Wyne. Underground sewerage and drainage system for psychopathic group: Contract executed May 2, 1921; completed July 30, 1921; cost, $7,345; contractor, Standard Engineering Co. Electric lighting, power, and telephone wiring for psychopathic group: Contract executed April 16, 1921; completed November 21, 1921; cost, $12,917; contractor, H. P. Foley Co. Two-pipe vacuum heating system for psychopathic group: Contract executed August 30, 1921; completed January 3, 1922; cost, $51,192.96; contractor, Federal Heating Co. Complete ventilating system for psychopathic group: Contract executed June 30, 1921; completed September 9, 1921; cost, $15,300; contractor, Standard Engineering Co. Complete plumbing system for psychopathic group: Contract executed July 19, 1921; completed September 24, 1921; cost, $55,060; contractor, Standard Engineering Co. Construction of power house, radial brick stack, including plumbing, electrical, and mechanical equipment: Contract executed June 23, 1922; contract time will expire October 17, 1922; cost to date, $104,796; contractor, M. B. Casey & Co. Electrical fixtures, etc.: Contract executed June 27, 1922; contract time will expire October 9, 1922; cost to date, $4,493.67; contractor, O. R. Evans & Bro.

Phelps School, located on Vermont Avenue, between T and U Streets NW. Amount appropriated for remodeling, $20,000. Con-

tract executed July 21, 1921; completed October 1, 1921; cost, $19,146; contractor, H. S. Hatton Construction Corporation.

Monroe School, located on Columbia Road, between Georgia and Sherman Avenues NW. Amount appropriated, $75,000. Contract executed November 8, 1921, for constructing a 4-room addition in the sum of $74,640; expiration of contract time, May 3, 1922; cost to date, $74,640. The blast system of heating and ventilating is used in this building. Contractor, M. Seretto. Cubic contents, 140,263 cubic feet. Cost per cubic foot, 35 cents.

Deanwood School, located at Whittingham and Lane Places NE., Deanwood, D. C. Contractual limitation for an 8-room building, $190,000. Amount appropriated, $190,000; work on 4-room addition was completed February 9, 1921; cost, $51,527.64. Additional four rooms contracted for December 2, 1921, for $94,700; expiration of contract time, July 21, 1922, extended to August 15, 1922, and will be completed within that time; cost to date, $81,714. The direct-indirect system of heating and ventilating is used in this building. Cubic contents, 257,649 cubic feet. Cost per cubic foot, 36.7 cents. Contractor, Henry B. Davis.

Wheatley School, located at Montello Avenue and Neal Street NE. Contractual limit for addition, $250,000. Amount appropriated, $250,000. Contract executed December 9, 1921, for 12-room addition and alterations for the sum of $206,194; expiration of contract time, August 6, 1922; work will probably be completed October 1, 1922; cost, $206,694 to date. The blast system of heating and ventilating is used in this building. Cubic contents, 590,400 cubic feet. Cost per cubic foot, 34.9 cents. Contractor, Parsons & Hyman.

John Eaton School, located at Thirty-fourth and Lowell streets NW. Amount appropriated, $140,000. Contract executed December 30, 1921, for an 8-room addition for the sum of $116,400; expiration of contract time, August 6, 1922; will be completed about September 15, 1922; cost of work to date, $116,650; contractor, M. Seretto. Contract for furnishing and installing mechanical equipment executed January 31, 1922; date of expiration, September 1, 1922; cost to date, $22,185. Cubic contents, 421,000 cubic feet. Cost per cubic foot, 36.2 cents. Contractor, Federal Heating Co. The split system of heating and ventilating is used in this building.

Lucretia Mott School, located on W Street, between Third and Fourth Streets NW. Amount appropriated, $140,000. Contract executed December 30, 1921, for an 8-room addition for the sum of $120,500; expiration of contract time, August 12, 1922; work will probably be completed September 1, 1922; cost to date, $131,696. Two steam boilers have been purchased for this building at a cost of $1,565.57. The direct-indirect system of heating and ventilating is used in this building. Cubic contents, 331,400 cubic feet. Cost per cubic foot, 36.3 cents. Contractor, H. D. Watts Co.

New Eastern High School, located on East Capitol Street, between Seventeenth and Nineteenth Streets NE. Contractual limit for building, $1,500,000. Appropriations have been made as follows: A balance of $28,448.65 from the appropriation for purchase of site made available toward construction of building; $300,000 appropriated by act of March 3, 1917; $60,000 by act of June 5, 1920; $240,000 by act of February 22, 1921; $900,000 by act of June 29, 1922; and

$250,000 for equipment by deficiency act of July 1, 1922. Contract was executed September 10, 1920, for work of making excavations for building; work completed, January 29, 1921; cost, $41,011; contractor, George Hyman. Contract was executed January 28, 1921, for construction of foundations and substructure; work was completed November 15, 1921; cost, $292,270; contractor, George Hyman. Contract executed November 9, 1921, for construction of superstructure in sum of $959,700; work to date has cost $950,106; expiration of contract time, November 9, 1922. The split system of heating and ventilating is used in this building. Cubic contents, 4,828,900 cubic feet. Cost per cubic foot, 26 cents plus. Contractor, George E. Wyne.

Lincoln Park School (Richard Kingsman School), located at southwest corner of Fourteenth and E Streets NE. Amount appropriated, $140,000. Contract executed January 31, 1922, for 8-room building for the sum of $98,500. Expiration, July 24, 1922. It is expected the building will be completed September 1, 1922. Cost to date, $98,380. Contractor, M. Seretto. Contract for mechanical equipment executed January 13, 1922; expiration July 24, 1922; cost, $22,950. It is expected the work will be completed by September 1, 1922. Contractor, Standard Engineering Co. The direct-indirect system of heating and ventilating is used in this building. Cubic contents, 253,570 cubic feet. Cost per cubic foot, 47.7 cents.

Buchanan School, located between Thirteenth and Fourteenth, D and E Streets SE. Amount appropriated, $140,000. Contract executed February 24, 1922, for an 8-room addition for the sum of $125,143. Contract expires September 6, 1922; work will probably be completed within contract time. Cost to date, $125,187. The split system of heating and ventilating is used in this building. Cubic contents 634,340 cubic feet. Cost per cubic foot, 36.4 cents. Contractor, M. A. Long Co.

Southeastern branch library, Edward L. Tilton, of New York architect, located on Seventh Street between South Carolina Avenue and D Street SE. Amount donated for building by Carnegie Fundation, $67,000. Contract for construction of this library building executed February 25, 1922, in sum of $56,798.25. Expiration July 1, 1922. It is expected that the building will be completed October 1, 1922. Cost to date, $57,234. Contractor, Arthur L. Smith & Co.

Building to replace Bell School, located on Second Street between D Street and Virginia Avenue SW. Amount appropriated, $140,000. Contract executed May 19, 1922, for 8-room building in the sum of $119,335. Expiration January 9, 1923. Cost to date, $120,082. The split system of heating and ventilating is used in this building. Contractor, H. D. Watts Co. Cubic contents, 311,835 cubic feet. Cost per cubic foot, 38.3 cents.

Farmers' produce market, located on B Street between Tenth and Twelfth Streets NW. Contract for construction of south shelter to this market executed May 19, 1922, in the sum of $4,096. Work completed July 17, 1922, at contract price. Contractor, W. E. Mooney.

Besides the preparation of plans and specifications for the above buildings, plans and specifications for about 40 other pieces of work, such as heating systems in engine houses, cell and other work in police

stations, repairs to heating systems in school buildings, etc., were prepared in this office, the contract prices therefor amounting to $61,489.

The contracts entered into by this office for the fiscal year beginning July 1, 1921, and ending June 30, 1922, amounted to a total of $2,334,055.

A comparison of the cost of municipal construction this year with that of the preceding year, based on cubage, is as follows: 1922, 31 to 33 cents per cubic foot (this year); 1921, 43 to 51 cents per cubic foot.

Buildings just prior to the war period were constructed at a cost of from 17 to 19 cents per cubic foot.

GENERAL.

The work done by the municipal architect's organization was carried on by the statutory personnel hereinafter enumerated, and an additional per diem personnel employed with the funds allotted this office for personal services, namely, $38,340.87.

STATUTORY EMPLOYEES.

	Salary per annum.
Municipal architect	$3,600.00
Engineering assistant	2,400.00
Heating engineer	2,000.00
Superintendent of construction	2,000.00
Chief draftsman	1,800.00
Draftsman	1,400.00
Draftsman	1,300.00
Clerk	1,200.00
Copyist	840.00
Driver	600.00

PER DIEM EMPLOYEES.

	Salary per diem.
4 draftsmen	$5.00
2 draftsmen	6.00
1 copyist	3.00
1 stenographer	3.50
8 inspectors	$5.00 to $6.00

At this point I would invite attention to the fact that the salaries of the employees of the municipal architects are commensurate neither with the duties and responsibilities required nor comparable with the salaries paid for the same kind of work by similar offices in the Federal service. A separate report has been prepared on this latter comparison which it is hoped will be presented to the proper congressional committee in due time. Many of our most able employees are leaving the District service for positions elsewhere, which would be more to their financial advantage. The present hope is that adequate personnel can be secured from time to time to carry on the necessary work.

I would suggest in connection with the organization of the municipal architect's office and the repair shop that consideration be given to a plan submitted in a former note, namely, that only such positions as should be considered permanent be placed upon the statutory roll and that all other positions in the office be put upon a per diem or temporary basis.

I consider the following positions should be permanent: Structural ngineer, mechanical engineer, chief draftsman, superintendent of onstruction, superintendent of repairs, clerk.

I would recommend that a new position, that of assistant to the nunicipal architect, be established. The duties of all but the last osition are well known and need not be defined further. The assistnt to the municipal architect should be thoroughly conversant with he office work so that in case the municipal architect is not available he office work may go on without interruption. This would require young man with a good architectural training and some executive bility.

In order to attract competent men for these positions, salaries ommensurate with the character of the work to be done and at least qual to those paid in similar positions in departments of the Federal Government should be paid.

In my judgment they should be as follows:

	Minimum.	Maximum.
tructural engineer	$3,300	$3,600
echanical engineer	2,700	3,000
hief draftsman	2,700	3,000
uperintendent of construction	2,700	3,000
uperintendent of repairs	2,700	3,000
ssistant to municipal architect	2,000	2,500

All other employees in the municipal architect's office and the epair shop, in my judgment, should be per diem employees whose ervices may be obtained from time to time as the office and shop ork demanded.

This scheme would maintain a skeleton organization of permanent mployees capable of directing an expansion of the activities of the ffice on short notice, and at the same time permit of an increase or ecrease of the larger part of the office and shop employees at will.

It is my judgment that these per diem employees should be paid om a fund based on a percentage of the cost of the volume of work be done. Outside architects receive a commission of 6 per cent r the preparation of plans, specifications, detail drawings, and superntendance. In a well-organized office the work of the architect an be done, including overhead, materials, and draftsman hire, for ightly more than 50 per cent of the commission. This would leave etween 2½ and 3 per cent profit. I would therefore suggest that ture allotments of money to the municipal architect's office for e payment of drafting service be made on this basis and that a sum money equal to 3 per cent of the total cost of the building be set ide for this purpose.

This method of procedure I believe is based on sound common nse and would place at the disposal of the municipal architect a fficient sum of money to hire the necessary assistants to complete tisfactorily any building program undertaken by the District of olumbia.

A. L. HARRIS,
Municipal Architect

To the ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF REPAIRS.

WASHINGTON, *August 15, 1922.*

SIR: I have the honor to forward herewith my annual report showing the operations of this shop during the fiscal year ended June 30, 1922.

There was appropriated by Congress:

Public schools, repairs to buildings, $225,000; all of which was spent except $167.16 reserved for any small bills that might come in after the close of the year.
Repairs to engine houses, $20,000; all expended.
Repairs to police stations, $8,000; all expended except $23.41.
Repairs to police court, $3,000; all expended except $47.43.

The foregoing amounts represent the actual cost of 4,783 separate jobs.

In addition to the work covered by the above appropriations (which are under the supervision of the superintendent of repairs), this shop did $74,461.02 worth of work on various buildings belonging to the District of Columbia out of appropriations controlled by other departments.

There were also inspected and repaired steam boilers in 89 buildings owned by the District.

The shop organization is composed of 5 annual employees, provided for by Congress, of 1 superintendent of repairs, at $1,800 per year; 1 assistant superintendent of repairs, at $1,350 per year; 1 clerk, at $1,050 per year; 1 clerk, at $1,000 per year; 1 clerk, at $720 per year; and from 115 to 225 employees on the per diem roll, artisans of various trades as well as skilled and unskilled laborers, their number and kind depending entirely on the time of the year and the work in hand. The greatest number employed is usually during school vacation, when work can be handled to best advantage.

Special attention is called to the following:

1. That a very large number of window lights are broken during vacation period.
2. That 27 buildings have very antiquated and unsatisfactory heating plants.
3. That 114 of the 153 permanent school buildings have no or insufficient artificial lighting.
4. That 4 schools still use an outside shed-type toilet.
5. That playground space is very limited about many schools.
6. That no standard material for surfacing of playgrounds has been adopted; urging the adoption after much experimentation of the cinder-sand material successfully used by the shop.
7. That considerable "fire hazard" still exists about many schools (inflammable materials in construction).
8. That there is not sufficient or adequate transportation, especially for foremen.
9. That the estimated cost of repairs is three times the amount of appropriation.

We have followed the practice of the last few years in compiling this report. Should more detailed information be desired, we can furnish a detailed statement of the cost of every job, or we can furnish

the expenditures under each class of work upon each and every building.

HENRY STOREY,
Superintendent of Repairs, District of Columbia.

To the MUNICIPAL ARCHITECT.

REPORT OF CONSTRUCTING ENGINEER AT DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY.

LORTON, VA., *October 5, 1922.*

SIR: I have the honor to submit herewith report of the operations of the construction division of the workhouse and reformatory for the fiscal year ended June 30, 1922.

This report includes a description and an account of the work under the supervision of the constructing engineer with cost statement of such work.

At Lorton, Va., just southwest of the present temporary buildings of the reformatory, it is proposed to construct 27 permanent buildings, as follows: 12 dormitories, 4 disciplinary dormitories, 5 shop buildings, 2 bathhouses, 1 dining room, kitchen, and bakery combined, 1 trade-school building, 1 assembly hall or auditorium, and 1 administration building.

At the beginning of the fiscal year 1921–22 the status of the work according to office records was as follows:

Dormitory, building No. 15.—Brick walls about 5 feet above footing.

Disciplinary dormitory, building No. 18.—Complete except for concrete floor and interior finishing.

Disciplinary dormitory, building No. 17.—Roof being put on.

Shop, building No. 19.—Brickwork about 12 feet above basement floor, forms in place, and reinforcing steel laid for reinforced-concrete floor of shop.

Shop, building No. 20.—Brickwork about 12 feet above basement floor to line of main floor.

Main sewers.—About 50 per cent complete.

During the fiscal year the following work was done:

Dormitory, building, No. 14.—Foundation partly completed.

Dormitory, building No. 15.—Brick walls raised about 3 feet all around.

Disciplinary dormitory, building No. 17.—Roof completed, sash hung and painted, iron grills placed at windows, cells partly bricked in, metal ceiling installed, steel cell fronts ordered.

Disciplinary dormitory, building No. 18.—Concrete floor laid and some plumbing fixtures installed.

Shop, building No. 19.—Reinforced-concrete floor laid and building completed except for heating system and electric lights on upper floor. Basement put in service as automobile garage and repair shop.

Shop, building No. 20.—Reinforced concrete floor completed. Brickwork complete and work started placing roof trusses in position.

Shop, building No. 21.—Concrete footings placed.

Heating tunnel.—A section approximately 160 feet long near shop buildings completed.

Area at site of buildings Nos. 21 to 23 graded; approximately 3,000 cubic yards of earth moved.

During the coming year it is proposed to complete as far as possible the 5 shop buildings, 2 dormitories, 2 disciplinary dormitories, 1 bathhouse, and remodel the present boiler house, after which new work will be continued along the line of dormitories adjacent to those now under construction. Grading work will be done whenever the laborers can be spared from the actual building construction.

The work of constructing these buildings is done by hired mechanics and prisoners in accordance with the following plan:

A hired mechanic is placed in charge of a working squad consisting of a number of prisoners. He works with the prisoners and instructs them in the work. There are squads for brickwork, carpenter work, concrete work, excavating, etc. The number of prisoners in these squads varies from time to time with the nature of the work and with the total number that is assigned to construction work from the institution.

An industrial railroad is being built from the wharf at Occoquan Creek extending to the workhouse and reformatory buildings with a proposed connection with the Richmond, Fredericksburg & Potomac Railroad near Pohick Station. That section of the road between the wharf and the workhouse buildings is completed and has been in operation since July, 1920. The grading of the roadbed between the workhouse and reformatory is now in progress. Previous to July 1, 1921, a section of the roadbed had been cut to grade from Giles Run to a point just west of the present reformatory buildings, a distance of approximately 2,500 feet. During the year 1,800 feet of roadbed was graded, extending south from Giles Run toward the workhouse buildings, by reformatory prisoners. Grading was started over a section about 300 feet long just north of the workhouse buildings by workhouse prisoners. With an adequate force of men kept at this work and contingent upon other conditions being favorable, this railroad should be in operation between the workhouse and reformatory within 18 months. A great effort is being made by the construction department to complete this section of the railroad.

Central power plant.—This plant is located on Occoquan Creek near the workhouse brickyard. It will furnish electric current for light and power for the reformatory and workhouse. An ice plant is also installed in part of this building. During the past fiscal year a large generator set was installed and tested with piping and other equipment and preparations were made in June, 1922, to put this plant in operation. During the coming year it is proposed to move a generator from the work house plant and an air compressor from the old pumping station to this plant. It is is also planned to place ice plant in operation.

A new electric-driven centrifugal pump will be installed in the pumping station and plans and estimates prepared for constructing a filtration plant and other improvements to the water system.

Temporary buildings at workhouse.—The eight temporary buildings constituting the main group of workhouse buildings near Occo-

quan, Va., are becoming very dilapidated and new permanent buildings are urgently needed.

During the past fiscal year very little permanent construction was done at this institution because of insufficient funds and the necessity of performing considerable repair work on existing buildings. In addition to the repair of existing structures one two-family brick cottage was completed, consisting mostly of interior finishing and concrete walks; a railroad trestle about 200 feet long, for dumping coal in storage, was constructed; and three wells for drinking water were dug at the following places: Near tailor shop at male department; near female department laundry; at residence of the superintendent of brick plant.

During the coming year it is proposed to begin construction of permanent buildings at this institution provided sufficient funds are available. Preliminary plans for this work have been prepared.

The tables below give the cost of each job of construction taken from cost of hired labor actually on each job and from cost of material requisitioned for each job, as has been reported in previous annual reports. The total expenditures from the appropriation for hired labor, bought materials, etc., may be obtained from the records of the reformatory and workhouse.

Work at the District of Columbia Reformatory.

Title.	Fiscal year 1922.					Cost previously reported June 30, 1921.	Total chargeable to the appropriation from beginning of work to June 30, 1922.
	Number days prison labor.	Number brick.	Cubic yards sand and gravel.	Paid labor.	Bought material.		
Permanent construction:							
Permanent buildings	10,620	370,050	745	$7,794.72	$10,298.44	$21,027.47	$39,120.63
Railroad	2,158	80,000	70	1,865.59	2,271.59	18,523.22	22,660.40
Locomotive house						697.55	697.55
Totten House	358	1,000		273.18		1,562.53	1,835.71
Pollock House				(1)		3,310.10	3,310.10
Officer's residence No. 1						2,899.83	2,899.83
Physician's residence				(1)	149.15	13,420.89	13,570.04
Chief clerk's residence	231			153.45	222.29	2,267.14	2,642.88
Hog pens	914			24.70	161.12	352.88	538.70
Construction engineer, truck					[1] 14.69	1,057.32	1,072.01
Total chargeable to permanent construction							88,347.85
Construction and repair for administration and upkeep:							
Temporary buildings	2,553	3,000		2,360.56	3,716.57	4,230.10	10,307.23
Central power plant				1,566.97	12,521.72	50,664.51	64,753.20

[1] See District of Columbia Workhouse.

Work at the District of Columbia Workhouse.

Title.	Expended during fiscal year 1922.					Cost previously reported, June 30, 1921.	Total chargeable to the appropriation from beginning of work to June 30, 1922.
	Number days prison labor.	Number of brick.	Cubic yards of sand and gravel.	Paid labor.	Bought material.		
Central power plant	1,292	3,750	170	$171.97	$8.52	$231.16	$411.65
Two family cottage	623	1,000	18	681.73	700.57	4,696.82	6,079.12
Locomotive house				(1)		1,337.95	1,337.95
Repairs at brickyard	207			368.13	1,179.99	3,447.71	4,995.83
Supertendent residence	160			443.43	272.23	970.64	1,686.30
Physician's residence	76			152.74	14.17	261.15	428.06
Tug Louise						658.94	658.94
Ninth Street wharf	10			36.10	65.97	1,014.58	1,116.65
Work at shipyard	405			602.93	49.08	4,804.19	5,456.20
Railroad trestle, etc	1,416	36,000	15	735.45	213.96	3,297.84	4,247.25
Assistant supertendent residence	83			217.13	271.37	422.82	911.32
Fruit cellar	40	4,150		56.00	141.80	1,275.31	1,473.11
Female department	277	2,400		422.19	443.41	646.79	1,512.39
Pollock house	25			68.68		98.68	167.36
New scale house	214	13,600		333.09	120.24		453.33
Total							30,935.46

[1] See D. C. R.

CONSTRUCTION AND REPAIR FOR ADMINISTRATION AND UPKEEP.

Temporary buildings	4,768	14,350	15	8,340.18	2,307.90	$13,113,78	$23,761.86
Construction engineer truck					20.84		20.84
Total							23,782.70

Total chargeable to the appropriations this year, $54,718.16.

Respectfully submitted.

HERBERT R. HAAR,
Constructing Engineer.

The MUNICIPAL ARCHITECT.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, *July 31, 1922.*

Sir: I submit herewith annual report covering the transactions of the building division during the fiscal year ended June 30, 1922.

No report of Federal Government operations has been received during the year.

Statement of permits issued from July 1, 1921 to June 30, 1922.

	Number.	Value.
Brick:		
Repairs	1,926	$3,263,343
Dwellings	1,532	11,564,140
Apartments	60	7,546,500
Stores	112	555,300
Warehouses	8	108,400
Garages	689	678,593
Bakery	1	3,500
Banks	4	505,000
Chapels	2	310,000
Churches	4	516,500
Clubhouse	1	80,000
Dairy	1	32,000
Dry-cleaning plant	2	15,000
Factory	1	30,000
Film exchange	1	100,000
Hospital	1	8,400
Ice plant	2	75,000
Hotels	2	1,953,350
Market	1	100,000
Manufacturing plant	1	80,000
Monastery	1	14,000
Office buildings	7	1,385,500
Offices	4	9,400
Oil storage tanks	1	10,000
Schools	2	71,000
Sunday school	1	23,000
Sheds	4	9,800
Storage buildings	4	159,000
Store and dwellings	18	322,500
Store and flat	1	25,000
Theaters	2	140,000
Hollow tile:		
Dwellings	19	269,180
Garages	59	34,010
Repairs	2	20,825
Hollow tile—continued.		
Shop	2	$2,700
Stores	2	2,300
Cafeteria	1	13,000
Sheds	6	2,075
Office	1	200
Warehouses	2	2,000
Concrete:		
Dwellings	7	22,130
Garages	96	167,912
Metal:		
Garages	4,724	365,868
Sheds	27	5,190
Gas holder	1	50,000
Frame:		
Sheds	385	34,491
Repairs	742	251,071
Dwellings	839	4,634,318
Garages	246	74,443
Office	1	500
Churches	2	39,247
Ice box	1	1,500
Cafe	1	1,000
Stores	2	500
Dormitory	1	5,000
Machinery:		
Elevators	76	311,075
Motors	530	191,598
Pressing machines	3	700
Total	9,174	36,197,059
Awnings	120	9,000
Signs	1,703	17,030
Grand total	10,997	36,223,089

The following summary shows the distribution of improvements in the respective sections of the District and the values of same:

	Buildings.	Repairs, etc.
Northeast	$484,734	$187,049
Southeast	740,331	148,477
Northwest	7,326,738	2,369,477
Southwest	17,035	128,975
County	23,109,267	1,684,976
Total	31,678,105	4,518,954
	4,518,954	
Sum total[1]	36,197,059	

[1] Does not include awnings or signs, the values of which are estimated.

Grand total for all building operations, $36,223,089.

Comparative statement for years 1921 and 1922.

	New Buildings.	Repairs, etc.	Dwellings.	Apartments.	Business Buildings.
1922	3,510	5,664	2,397	60	1,053
1921	1,605	5,323	772	14	819
Increase	1,905	341	1,625	46	234

Valuation of building operations, including awnings and signs:	
1922	$36,223,089
1921	19,025,291
Increase	17,197,798
Permits issued, number of, including awnings and signs:	
1922	10,301
1921	8,310
Increase	1,991

Estimated number of buildings in the District of Columbia.

	Brick.	Tile.	Concrete.	Stone.	Frame.
1922, erected	2,470	91	103	000	88
1922, razed	84				10
	2,386	91	103	000	78
1921	69,260	269	109	2	27,58
Total estimated number standing	71,646	360	212	2	28,66

During this period there were issued 3,002 conforming certificates of occupancy and 295 nonconforming certificates, the fees therefor totaling $3,305.50.

A comparison of the foregoing tabulation with the reports of previous years shows an increase in the value and volume of operations in excess of the yearly average covering the entire history of the department, even when the present high cost of materials and labor is taken into consideration. The increase over 1921, for example, in valuation was $17,197,798, whereas the total yearly valuation of building operations for the past 15 years will average approximately $9,000,000. This increase has, of course, added in a corresponding degree to the work of the office without any permanent increase in the number of employees. For the fiscal year 1923 there was an appropriation of $20,000 made by Congress for the employment of temporary additional inspectors, following the recognition on the part of the public, as a result of the Knickerbocker Theater disaster, of the fact that the department was undermanned. But this relief fails to meet the necessities of the situation. While the full quota of employees which the appropriation justifies has been filled, there is no assurance that the staff will remain intact throughout the year. Indeed, experience indicates the contrary.

During 1922 three engineers resigned to accept more lucrative employment with engineering firms. Recently two experienced clerks withdrew from the service because of greater salary inducement elsewhere. The filling of these positions is difficult. In the case of engineers, it has been found that either promising men accept positions with the idea of gaining such practical experience as will enable them to make more advantageous connections outside, or experienced engineers decline to enter the service because only temporary employment may be promised. In the case of clerks the salaries are so meager that competent men frequently utilize the experience gained merely as a stepping-stone to more renumerative jobs.

Notwithstanding the handicaps under which the department has been compelled to operate, a recent survey has been made of all the theaters, public halls, etc., in the District, and, while no actually dangerous conditions have been found, those of the older buildings not in strict compliance with the present regulations are being so altered as to conform therewith, and the National and Poli Theaters are undergoing complete reconstruction, and, when finished, will meet in every respect the latest approved engineering standards of safety and security.

It is believed fitting to urge attention to the fact that the force of this office, except for the temporary employees referred to above, has not been augmented for years past. At the time of the Knickerbocker catastrophe the personnel consisted of the inspector of buildings, 13 assistant inspectors, a fire-escape inspector, 3 engineers or computers, a chief clerk, 4 underclerks, and a messenger, who also acted as chauffeur. The salary of the inspector was $3,000 a year, that of the principal assistant was $2,000; 2 assistants were paid $1,500 each, 1 was paid $1,400, and the remainder $1,300 each. The salaries of the engineers were, respectively, $2,000, $1,800, and $1,500. The fire-escape inspector's salary was $1,400, and that of the chief clerk $1,800, while the average pay of the underclerks was $1,000.

These salaries are the same as now received.

Three of the assistants were, and are, assigned to the inspection of elevators, supervising the installation and making quarterly examinations thereafter with respect to the safety of operation. One assistant acts as an aid to the fire-escape inspector, leaving nine for inspection of general construction, etc.

With the growth of the District, the difficulty of efficient administration has become more and more pronounced, particularly since steel and concrete construction has become so prevalent, and the administration of the zoning regulations has been added to the duties of the office.

There has seemed to be a general misapprehension of the department's full scope—an impression that the issuance of permits and the inspection of buildings in the course of erection constitute the complete function of the office. The facts are that all plans must be examined by the engineers or computers to see that they comply with the building and zoning regulations as well as accord with approved engineering standards. Years ago, before building operations had assumed such proportions and when steel and concrete construction were comparatively undeveloped, the checking of plans could be accomplished approximately concurrently with their filing. Obviously, such dispatch is impossible now.

The engineers must also check radius or area plats which must be filed in connection with the consents of property owners to the establishment of garages, the installation of motors and similar apparatus.

The inspectors are required not only to inspect buildings of all classes during the course of erection, filing daily a record of the progress thereof, and seeing that the plans as approved are followed, but they must see that the materials used are of the standard laid down in the building code. In addition, they must respond to all complaints of the dangerous or depreciated condition of structures, and even party fences, to all reports of the police, fire, and health departments, or of the private citizen to the effect that buildings are being used for purposes prohibited by the regulations; and must serve notices of infractions of the building or zoning provisions.

This meant that, prior to the World War, each man was charged with the inspectional supervision of, conservatively, 350 "live" jobs, in addition to the miscellany embracing complaints, etc. As clearly demonstrated by the statistics for 1922, his labors have been increased at least 100 per cent.

The fire-escape inspector is required to see that all buildings of a public or quasi-public character, such as hotels, apartment houses,

theaters, etc., are equipped with fire escapes when required by law; and are provided with such fire extinguishers as are necessary to afford protection against fire hazard. Yearly inspections must also be made by this official to determine that the classes of buildings mentioned are in compliance with law, licenses for the conduct of such buildings being withheld by the license bureau until applications therefor have been approved by this department.

The fire-escape inspector is also charged with the duty of making frequent examinations to ascertain that there is no deterioration in equipment, that exits are kept clear of obstruction, and that the aisles in theaters and similar structures are not encroached upon by chairs or patrons.

The temporary addition to the force provided for 1923 has been assigned as follows: Four to assist the engineering or computing force; one to inspect steel or iron work exclusively; two as concrete inspectors; and three as general field inspectors. This distribution has already justified its conception, although made possible only since July. The arrangement enables the office to check plans more rapidly and to keep in constant touch with building operations of a major character, and thus protect the public to a degree heretofore impossible against the use of faulty materials and against lax or incompetent workmanship.

It is desired to stress the fact, however, that no matter how capable these employees may be, their employment being merely temporary can not fail of militating to some extent against efficiency of administration and may, perhaps, exercise an undesirable effect upon the morale of the organization; for it has been found necessary to compensate most of the temporary employees at a rate in excess of the salaries paid statutory men, many of whom have been in the service for years, although it can not be said that an average of $6 a working day is an extravagant remuneration for the services performed.

It is desired, too, to emphasize the fact that, while this additional force will greatly aid in the dispatch of business, as well as in inspectional work, the lack of a relative increase in the clerical force places the office at a distinct disadvantage in the preparation and filing of its records and in the endeavor to serve the public in the matter of giving information, of expedition in handling applications, and of issuing building permits or certificates of occupancy under the zoning regulations.

The revision of the building code has been in process since November, 1921. The typed draft is now in shape to be submitted to the commissioners for their consideration.

In the work of revision the latest revised codes of several of the larger cities have been consulted, as well as the committee appointed by Secretary Hoover to prepare a standard building code; also the American Society for Testing Materials, and all other recognized standard authorities on building, building materials, and building codes.

In comparing the present building regulations with those of other cities of equal importance, I find that the District Code is conservative and comparable with the best. In the revision the endeavor has been to bring the code up to the best standards of practice for

safe and economical building construction. That this standard may be maintained, the department should be able to keep in close touch with the use of new materials, new methods of design, and to avail itself of conferences with the highest authorities. For the purpose of defraying the expense incidental to such investigations, it is urged that the sum of $500 be provided.

There should be an additional appropriation also of $1,200 for the maintenance of motor cars furnished by the owners in connection with inspectional work. Such an allowance would permit more frequent inspections and would at the same time prove financially economical, as the services of at least three inspectors could be dispensed with, provided the full number now engaged were placed upon the statutory roll.

The present extraordinary activity in building construction will not, it is believed, be indefinitely maintained, but its continuance through the next fiscal year, with perhaps some modifications, is predicted by those best advised. For this reason an appropriation of $15,000 for the employment of temporary inspectors has been sought for the fiscal year 1924. Such a policy, however, can not prove satisfactory, for the stability of the force can not be assured. Even though the volume of operations now being conducted be admitted as abnormal, the steady and increasing growth of Washington is an unequivocal refutation of the idea that building construction will revert to a pre-war status. It is absolutely necessary, therefore, that the permanent force of this office be substantially increased in all departments, and that the salaries be raised to figures commensurate with the duties of the respective positions.

The function of this office is primarly to safeguard the public in the matter of building construction. The public has the right to assume that every place of public assembly is structurally adequate; the builder of a home is justified in depending upon this office to see that his house is erected in such a manner as will insure his safe occupancy; the patrons of a hotel, the tenants of an office building, properly rely upon the building inspection division to adopt and enforce such regulations as will guarantee integrity of construction. But while properly charged with responsibility to the extent indicated, the inspector of buildings should not be called upon to correct the design of a building the plans for which do not comply with the regulations. The standards of construction, based upon approved and thoroughly tested engineering practice, are prescribed by the building code. With these standards engineers and architects are supposed to be, and should be, conversant. Should the plans submitted, therefore, fail to meet the requirements it is not the duty of the inspector of buildings to make the necessary corrections; this is an obligation the architect assumes when he accepts the commission to prepare drawings. In brief, the inspector of buildings, by his approval of a submitted design, warrants the safety of the building when erected in accord therewith. But the province of his office ceases here. The architectual treatment is not within his purview. Indeed, from a strictly official viewpoint, he is not required to point out wherein a scheme presented for examination failed to meet the factors of safety laid down in the regulations. He fulfills his duty when he has by computation determined that such failure exists *and so informs the applicant.*

It should not be sought, in other words, to impose upon the inspector of buildings the discharge of an obligation clearly and specifically resting upon the architect or engineer. It is a fact, however, that such an unreasonable position is not infrequently taken. This may sometimes be due to a sincere misconception of the inspector's duties. Often, however, the endeavor has been made to tax this office with neglect when the truth is that derelictions should be laid at the door of the engineer or architect.

There are no qualifications prescribed by law which one must possess before practicing either of these professions with the result that commissions are at times accepted by those lacking the technical ability to fulfill their contracts.

The attempt is then made to ascribe to this office the responsibility for the resultant denial or the delay in the issuance of permits.

It is believed that the public, understanding conditions, will acknowledge the injustice of demanding of the building inspection division of the Washington of to-day an irreproachable administration when it is realized that the division has at its command the same statutory force, receiving the same grossly inadequate salaries, as obtained 20 years ago.

With a staff of employees reasonably required by the duties devolving upon the office, and with a schedule of salaries reasonably compensatory, it is felt that the public will have no just cause of complaint to lodge against this bureau of the municipal government.

Inspection of boilers.

Boilers inspected		470
Boilers inspected for the District of Columbia (no fee)		36
Boilers condemned as unfit for further use		12
Cases of scale and deposit		52
Cases of defective setting		22
Cases of defective steam gauges		10
Cases of defective tubes		75
Cases of defective steel plates		25
Cases of working pressure reduced		12
Total amount received	$2,350	
Total amount expended	370	
Compensation of inspector		1,980

Very respectfully,

JOHN P. HEALY,
Inspector of Buildings.

ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF THE PERMIT CLERK, ENGINEER DEPARTMENT.

WASHINGTON, *August 1, 1922.*

SIR: I have the honor to submit the following report of the permit clerk's office, giving the number of permits issued during the fiscal year ended June 30, 1922:

Water connections	2,317
Repairs	744
Specials (no fee)	121
Sewer connections	2,361
Repairs	690
Specials (no fee)	981

Gas mains and connections	2,531
Repairs	304
Specials (no fee)	11
Electric construction, underground connections	2,425
Repairs	77
Specials (no fee)	12
Conduits	419
Manholes	224
Automobile air pipe lines and private conduits	11
Fences to inclose parkings	431
Guard stones in alleys	12
Poles—erect, replace, and remove	996
Miscellaneous	44
	14,711
Permits for various kinds of work in public space	3,995
Total permits issued	18,706

Fees of $1 each were paid for 13,586 and permits for which no fees were paid 5,120.

Record cards were made of all files referred to this office, permits issued or reports made and the files returned to the various divisions having supervision of the inspections of work for which permits were issued.

Applications for permits were filed according to location and report of excavations in public space were made to the engineer of highways for necessary repairs.

Very respectfully,

H. M. WOODWARD,
Permit Clerk.

To the INSPECTOR OF BUILDINGS.

REPORT OF BOARD OF EXAMINERS OF STEAM ENGINEERS.

WASHINGTON, D. C., *September 7, 1922.*

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

SIRS: The board of examiners of steam engineers have the honor to submit to you the report for the year ended June 30, 1922. The following table shows the work as it progressed during each month:

	Meetings held.	Applicants received.	Applicants approved.	Applicants not competent.	First class.	Second class.	Third class.	Gas fired for pressing machines.	Special class.
1921.									
July	5	44	33	11	2	0	4	27	0
August	4	30	20	10	.....	1	3	16	.....
September	5	22	13	9	1	1	7	2	2
October	4	26	18	8	3	0	3	11	1
November	4	14	8	6	1	0	3	3	1
December	5	23	11	12	0	0	2	6	3
1922.									
January	4	8	8	.....	.....	.....	1	5	2
February	4	39	30	9	2	0	3	23	2
March	5	20	9	11	0	0	5	3	1
April	4	13	9	4	0	0	2	2	5
May	4	12	6	6	0	0	1	3	2
June	6	11	7	4	0	0	3	4	0
Total	54	262	172	90	9	2	37	105	19

Our estimate of expenses for the year ending June, 1914, has been submitted to the secretary, Board of Commissioners. We most respectfully ask that the amounts set forth be appropriated.

Respectfully submitted,

E. F. VERMILLION,
H. BOESCH,
WM. T. EVANS,
Board of Examiners of Steam Engineers.

REPORT OF THE INSPECTOR OF PLUMBING.

WASHINGTON, D. C., *September 1, 1922.*

SIR: I am submitting herewith the fortieth annual report of the plumbing inspection division of the engineer department:

During the last year there were 18,384 inspections of plumbing work in new buildings; 7,539 inspections of plumbing work in old buildings; 12,085 inspections in connection with complaints made of condition of plumbing and guttering and spouting in old buildings; making a total of 38,008 plumbing inspections made by the general field force of the office. In addition to this there were 1,037 inspections made of District or United States Government work, and 2,680 special inspections or visits made by the head of the office, the principal assistant, and the head of the complaint division, in connection with appeals from the District inspectors, police court cases, conferences with witnesses of illegal plumbing installation, etc., making a total of 41,725 inspections made by the office during the year.

This is 25 less than the total number of inspections made during the last fiscal year, but by reason of the building up of the suburbs this number of inspections occasioned really more work for the field and office force than last year. The total number of inspections made by the field force, divided by the actual number of days on duty, shows that the average work was nearly 14 inspections per man per day. The largest number of inspections in any one day was 32.

OFFICE WORK.

The amount of work performed by the office force was greater this year than ever before, a total of practically 34,000 separate and distinct operations, such as writing of letters and indorsements, preparation of notices, etc., being accomplished.

COMPLAINTS.

It is interesting to note that practically one-third of all the inspections made by the field force, and more than one-half of all of the operations of the clerical force were caused by complaints of insanitary plumbing in old houses or defective down spouts and gutters. This is of course somewhat a temporary phase, due to the present housing conditions.

REGULATIONS.

During the year there were no changes of consequence in the plumbing regulations, but several are contemplated which may materially reduce the cost of plumbing to the householders and at the same time tend toward the improvement in the general sanitary condition of the District.

POLICE COURT CASES.

During the year it was necessary to obtain 39 warrants, 18 for violation of the plumbing regulations by householders and 21 against unlicensed plumbers doing improper work. Sixteen of these cases were disposed of by reason of compliance with the regulations; fines were obtained in 18 cases; personal bonds were taken in 3 cases on promise to comply with the requirements of the office; and but 2 of the entire 39 cases were dismissed by the court for lack of evidence. The total amount collected from fines in the 18 cases was $385.

COMPULSORY DRAINAGE.

During the last fiscal year 275 cases of sewer and water connections and other plumbing work were referred to this office by the health office and other divisions of the District government for prosecution under the terms of the drainage act and the nuisance act, the cost of which was to be assessed against the property. In a very great many of these cases the required repairs were made by the agent or owner after the proper notice and there remained but 45 cases where this office finally had to do the work and assess the cost. At the close of the fiscal year there were still pending in this office 30 cases which could not be immediately prosecuted, by reason of legal questions, questions of ownership, etc., and there are 11 cases still under notice.

PLUMBING BOARD.

The plumbing board held 24 meetings and examined 66 applicants, of whom 11 passed and were granted license, so that at the close of the fiscal year there were 238 registered master plumbers in the District, about 190 of them being actively engaged in business. There were also 8 registered gasfitters.

PUBLIC CONVENIENCE STATIONS.

There were in operation throughout the year four convenience stations, open from 6 a. m. until midnight, with two shifts of attendants, each working nine hours per day. The largest station, that at Seventh Street and Pennsylvania Avenue NW., accommodated 8,581,984 persons; that at Thirteen-and-a-half Street and Pennsylvania Avenue NW., 2,570,580; that at Ninth and K Streets NW., 2,420,648; and that at Fifteenth and H Streets NE., 137,204, making a total patronage of these four stations of over 13,000,000 users during the fiscal year. The records show that the women used the stations a little over one-eighth as much as the men and contributed about one-tenth of the receipts. The cash receipts for the year amounted to $9,377.03, and consisted of 5-cent fees received for use

Work at the District of Columbia Workhouse.

Title.	Expended during fiscal year 1922.					Cost previously reported, June 30, 1921.	Total chargeable to the appropriation from beginning of work to June 30, 1922.
	Number days prison labor.	Number of brick.	Cubic yards of sand and gravel.	Paid labor.	Bought material.		
Central power plant	1,292	3,750	170	$171.97	$8.52	$231.16	$411.65
Two family cottage	623	1,000	18	681.73	700.57	4,696.82	6,079.12
Locomotive house				(1)		1,337.95	1,337.95
Repairs at brickyard	207			368.13	1,179.99	3,447.71	4,995.83
Supertendent residence	160			443.43	272.23	970.64	1,686.30
Physician's residence	76			152.74	14.17	261.15	428.06
Tug Louise						658.94	658.94
Ninth Street wharf	10			36.10	65.97	1,014.58	1,116.65
Work at shipyard	405			602.93	49.08	4,804.19	5,456.20
Railroad trestle, etc	1,416	36,000	15	735.45	213.96	3,297.84	4,247.25
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New scale house	214	13,600		333.09	120.24		453.33
Total							30,935.46

[1] See D. C. R.

CONSTRUCTION AND REPAIR FOR ADMINISTRATION AND UPKEEP.

Temporary buildings	4,768	14,350	15	8,340.18	2,307.90	$13,113,78	$23,761.86
Construction engineer truck					20.84		20.84
Total							23,782.70

Total chargeable to the appropriations this year, $54,718.16.

Respectfully submitted.

HERBERT R. HAAR,
Constructing Engineer.

The MUNICIPAL ARCHITECT.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, *July 31, 1922.*

Sir: I submit herewith annual report covering the transactions of the building division during the fiscal year ended June 30, 1922.

No report of Federal Government operations has been received during the year.

same as last year when the population was 437,571, though the mean daily total consumption is about 1,800,000 gallons above the same item last year.

The department has invited attention to the excessive use of water in quite a number of Government buildings but has not been very successful in securing a reduction to any appreciable extent in the quantities used.

The large fountains in the District of Columbia at very little expense could be equipped with electrically-controlled motor-driven pumps and filtered water could be used over and over again by means of these pumps with very little waste. There is no question in my mind but that these fountains would add greatly to the enjoyment of the public if some means, as suggested, could be used to place them in operation.

There are a number of places in buildings under control of both the Federal and District Governments where a more careful observation and supervision of the use of filtered water would be the means of eliminating much waste.

The department has under investigation the question of a high-pressure fire service for the business section bounded, roughly speaking, by First and Eighteenth, B and H Streets NW. Up to the present time our investigation of this matter is not in such shape as to allow a full report on same, but in a short time the department will be in a position to submit a report with an estimate of cost of the installation of this fire service; the idea being to build a pumping station at the foot of about Twelfth or Thirteenth Street, using electrically driven centrifugal pumps giving a discharge pressure of between 125 and 300 pounds over the area above mentioned.

In my opinion the most important main laid during the fiscal year was the 12-inch one in Sixteenth Street between I and U Streets NW. This main passes through a very important section where large apartments and residences were formerly supplied by 4-inch and 6-inch mains, these smaller mains being removed at the time of the laying of the 12-inch.

The department has under consideration the extension of pump service in the vicinity of the high points along Bennings Road east of the Anacostia River. A project for this extension will be forwarded shortly and will assist greatly in securing better service for this territory. Necessarily the scope of this extension can not be very extensive owing to restricted storage capacity in this area.

Attention is invited to the question of the disposal of valuable real estate, situated in square No. 175, now owned by this department. This property is in the block bounded by Sixteenth and Seventeenth, U and V Streets NW., and represents an investment of $66,500. This property is no longer used or needed by the water department, but is used by other departments of the District government. If sold, as suggested, the sum obtained could be used to advantage in making needed extensions of the distribution system.

I wish to record my appreciation of the work done by the employees of this department.

J. S. GARLAND,
Superintendent, Water Department, D. C.

ASSISTANT TO THE ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION.

A 16-inch water main was laid in Upshur Street between New Hampshire Avenue and Rock Creek Church Road NW. The laying of this main gives an adequate supply of water to the Soldiers' Home for fire protection, as well as a supplemental supply for domestic purposes adjacent thereto.

A 16-inch water main was laid in Kennedy Street between Illinois Avenue and Fourteenth Street NW. This main acts as a trunk as well as a service main, as it is fed directly off the 20-inch third high-service main in Illinois Avenue. It is proposed to extend this main from Fourteenth Street to Sixteenth Street in the near future.

Twelve-inch water mains were laid as follows:

Gallatin Street east from Sixteenth Street NW.
Sixteenth Street between Webster and Decatur Streets NW.
Webster Street west from Seventeenth Street NW.
Twenty-first Street south of B Street NW.
Fessenden Street between Wisconsin Avenue and River Road NW.
Shepherd Street west from Fourteenth Street NW.
Sixteenth Street north from Emerson Street NW.
Fourteenth Street between Jackson and Irving Streets NW.
Sixteenth Street between I and U Streets NW.

Of the above list of 12-inch mains the most important was the one laid in Sixteenth Street between I and U Streets NW. This main passes through a very important part of the northwest section where, formerly, large apartments and residences were supplied by 4-inch and 6-inch mains. These smaller mains were removed at the time of the laying of the 12-inch main. The line of this main is in the parking practically all of the way, and at the writing of this report hardly a trace can be found showing the line of trench where opened.

The 12-inch main laid in Sixteenth Street between Webster Street and Colorado Avenue NW. was a supplemental main for the third high area and affords an increased supply as well as better fire protection.

Repaired the 36-inch United States Government main in First Street SE. twice during the year.

INSTALLATION AND MAINTENANCE OF WATER METERS, ETC.

On July 16, 1921, the work of installation and maintenance of water meters, taps, and inspection of service pipes was turned over to this division. The following amount of work has been completed from that date until June 30, 1922:

Meters installed:	
New locations	2,043
For building purposes	51
District of Columbia meters:	
Leaking, replaced	904
Not registering, replaced	1,731
Choked, replaced	25
Removed for lack of pressure	101
Adjusted to grade	126
Abandoned	63
Repaired in place	211
Removed for repairs	145

District of Columbia meters—Continued.	
Removed on account of noise	26
Reset on new service pipes	25
Set, temporary	162
Removed, temporary	107
Set temporary, removed	22
Reported leaking, found O. K	241
Private meters:	
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Reset after repairs	285
New service pipes inspected	1,901
Service pipes inspected for repairs	559
Taps installed (sizes ¾ inch to 2 inches)	2,182
Taps removed, main plugged	43
Service pipes abandoned	33
New covers placed on curb boxes	47
Curb boxes adjusted	39
Meter boxes adjusted	68
Meter boxes replaced	74

Average cost of installing a ¾-inch water meter by the department, in cellars:

Meter [1]	$7.75
Material	1.51
Labor	1.04
Total	10.30

STEAM ENGINEERING.

The following is a summary of the work done at the District pumping station during the year:

Water pumped, figured from plunger displacement:		
First high service	gallons	7,172,011,620
Second high service	do	3,351,228,560
Third high service	do	1,216,843,990
Total	do	11,740,084,170
Fourth high service	do	91,951,380
Coal burned	tons	7,333
Cylinder oil used	gallons	1,072
Engine oil used	do	1,377
Filtered oil used	do	1,089
Turbine oil used	do	1,050
Grease used	pounds	414
Waste used	do	656

The regular force employed at this station in the daily operation of the pumping engines, boilers and auxiliaries, cleaning of machinery, etc., consisted of three crews of three engineers in charge, three assistant engineers, three firemen, three oilers, and three cleaners, working in 8-hour alternate shifts, "six days on and one day off" per week, being relieved on "days off" by an extra engineer crew.

For the fourth high service the water is pumped from the Reno Reservoir, which is supplied by the third high service pumps, to an elevated tank by gasoline engines and triplex pumps. This machinery is operated daily by three enginemen who work on 8-hour shifts.

[1] Stock meter. No meters were purchased during the year

The water pumped for this service during the year was 91,951,380 gallons, or a mean of 251,922 gallons daily.

The Anacostia pumping station has been operated without interruption during the year, pumping to the three towers supplying the area east of the Anacosta River. This station is taken care of by four enginemen who work on 8-hour shifts. The water pumped for this service during the year was 145,916,180 gallons, or a mean of 399,770 gallons daily.

The total pumpage for the year at the District pumping station was 380,191,440 gallons more than in 1920–21. The greatest amount pumped in 1 day (January 10) was 38,340,780 gallons; least in 1 day (January 9) was 25,376,620, and the average dynamic head against pumps was 122.7 feet. The total operating expenses (excluding overhead) chargeable to pumping was $102,637.92, as against $118,195.29 in 1920–21, making the total operative cost (excluding overhead) of pumping 1,000,000 gallons of water into the mains $8.74. This is $1.66 per million gallons less than in 1920–21, and is mainly due to a reduction in the cost of the coal used. The average cost of coal per ton for the year was $6.94, which was $2.26 less than in 1920–21.

The station duty for the year was 75,558,706 foot-pounds per 100 pounds of coal. This is 11 per cent more than the duty obtained during the preceding year, and represents an annual saving of approximately 212.2 gross tons of coal. This saving in coal may be attributed partly to a slightly greater proportionate amount of work performed by the high-duty pumping units, and largely to the improved economic operation.

Especially important work done during the year includes (1) replacement at the District pumping station under contract No. 7170 of our old Nos. 1 and 2 Babcox & Wilcox boilers with new ones, by the Babcox & Wilcox Co. of Philadelphia; (2) necessary repairs made to our present Nos. 3 and 4 boilers, which will probably add about 6 years or more to the life of same; (3) replacement of the original reduction gear, casing and bearings on No. 1 pumping unit with new parts, including roller bearings, after the rotor had been repaired at the factory; (4) erection under contract No. 7199 of a cast-iron platform around No. 3 pumping unit by J. C. Moyer, of Philadelphia; and (5) installation of "S–C" feed-water regulators on boilers Nos. 5 to 8; (6) the installation of mufflers on engines at Anacostia pumping station; and (7) preparation of specifications covering proposed 10,000,000 gallons centrifugal pumping unit for the third high service.

WATER SURVEYS.

Since July 16, 1921, the work of this division has included the handling of all complaints of leaks, damp cellars, low pressures, no water, and similar cases previously disposed of by the water registrar's office. This work was transferred to the Water Survey Division, together with the personnel formerly handling it, for the purpose of consolidating all leaks and allied investigations under one organization. In the tables submitted herewith showing the activities of this division during the past year this new work is classified under "complaint investigations" as opposed to "underground leak investigations" which covers the work previously handled by the water survey divi-

sion. All work performed during the year is covered by the tabulated statements and lists on file.

Particular attention is invited to the fact that the total underground leakage found and prevented was at the rate of 1,678,500 gallons daily, the largest quantity found in any single year since 1917. This is particularly significant of increasing leakage in view of the fact that a smaller force was engaged in this work. The average waste per lead (5,952 gallons per day) is slightly higher than the previous year's figure but substantially the same as for the past 10 years. A total of 282 individual underground leaks was found against 187 last year; an increase of approximately 50 per cent. This is the greatest number found since 1917. Ample evidence is available supporting the theory that the underground leakage is increasing rapidly.

It has been particularly gratifying to note throughout the year a complete absence of friction between the field forces and the public with which they deal as well as a most conspicuous desire to assist each other in the matter of disposing of all where cases overlapping of duties or cooperation is necessary. This feature is creditable to the employees and is worthy of the department's appreciation.

YEAR'S RESULTS, 1921–22.

Underground leakage investigations.

Service pipes inspected:	
Metered	18,547
Unmetered	1,755
Houses inspected, unmetered	4,048
Houses with defective fixtures	75
Number of notices served	135
Number of services cut off	24

Underground leakage.

Class.	Number.	Gallons per day.
Abandoned services, taps, etc	6	57,400
Iron services	62	450,240
Lead services	23	254,700
Wiped joints	15	88,260
Services, metered	22	116,436
Couplings	5	15,700
Stopcocks	2	5,000
Joints on mains	58	449,640
Fire hydrants	0	0
Horse troughs	0	0
Valves	3	20,300
Broken main	1	200,000
Meters	85	20,850
Total	282	1,678,526

Complaint investigations.

Complaints answered	3,541
Reexaminations	4,405
Cut-offs	442
Water supplies turned on	7
Abandoned services cut off	7
Leaks on mains found	25

Our estimate of expenses for the year ending June, 1914, has been submitted to the secretary, Board of Commissioners. We most respectfully ask that the amounts set forth be appropriated.

Respectfully submitted,

E. F. VERMILLION,
H. BOESCH,
WM. T. EVANS,
Board of Examiners of Steam Engineers.

REPORT OF THE INSPECTOR OF PLUMBING.

WASHINGTON, D. C., *September 1, 1922.*

SIR: I am submitting herewith the fortieth annual report of the plumbing inspection division of the engineer department:

During the last year there were 18,384 inspections of plumbing work in new buildings; 7,539 inspections of plumbing work in old buildings; 12,085 inspections in connection with complaints made of condition of plumbing and guttering and spouting in old buildings; making a total of 38,008 plumbing inspections made by the general field force of the office. In addition to this there were 1,037 inspections made of District or United States Government work, and 2,680 special inspections or visits made by the head of the office, the principal assistant, and the head of the complaint division, in connection with appeals from the District inspectors, police court cases, conferences with witnesses of illegal plumbing installation, etc., making a total of 41,725 inspections made by the office during the year.

This is 25 less than the total number of inspections made during the last fiscal year, but by reason of the building up of the suburbs this number of inspections occasioned really more work for the field and office force than last year. The total number of inspections made by the field force, divided by the actual number of days on duty, shows that the average work was nearly 14 inspections per man per day. The largest number of inspections in any one day was 32.

OFFICE WORK.

The amount of work performed by the office force was greater this year than ever before, a total of practically 34,000 separate and distinct operations, such as writing of letters and indorsements, preparation of notices, etc., being accomplished.

COMPLAINTS.

It is interesting to note that practically one-third of all the inspections made by the field force, and more than one-half of all of the operations of the clerical force were caused by complaints of insanitary plumbing in old houses or defective down spouts and gutters. This is of course somewhat a temporary phase, due to the present housing conditions.

Statement of the water fund of the District of Columbia for the fiscal year ended June 30, 1922.

CREDITS.

Water fund, cash balance in the Treasury of the United States	$161,344.46	
Requisition balances:		
Water department, District of Columbia, 1921	39,664.18	
Increase of compensation, water department, District of Columbia, 1921	3,471.74	
Water department, District of Columbia, 1920	3,972.10	
Increase of compensation, water department, District of Columbia, 1920	878.70	
		$209,331.18
Water rents	943,182.45	
Taps and stop cocks	12,145.45	
Water main assessments	83,746.41	
Interest	2,679.15	
Sales of material	2,455.49	
		1,044,208.95
Repayments and credit transfers		54,220.14
		1,307,760.27

DEBITS.

Appropriation, water department, District of Columbia, 1922:		
Salaries—		
Revenue and inspection branch	$38,319.56	
Distribution branch	57,114.67	
Contingent expenses	4,349.43	
Maintenance and operation	392,185.88	
12-inch main, Sixteenth Street, between I and U Streets	28,304.05	
Extension distribution system	127,231.63	
Installing water meters	19,809.36	
Installing fire and public hydrants	18,150.82	
Refunds	1,187.24	
		686,652.64
Increase of compensation, water department, District of Columbia, 1922		24,212.05
Appropriation, water department, District of Columbia, 1921:		
Contingent expenses	$1,278.00	
Maintenance and operation	32,556.11	
Extension distribution system	852.89	
Installing water meters	3,684.78	
Installing fire and public hydrants	13,033.10	
		51,404.88
Increase of compensation, water department, District of Columbia, 1921		825.76
Appropriation, water department, District of Columbia, 1920:		
High service		1,842.85
Appropriation, water department, District of Columbia, 1919 and prior high service		3.00
Refunding water rents, etc., District of Columbia		6,822.56
Total water department expenditures		771,763.74
Advances account, Washington Aqueduct appropriations:		
Washington Aqueduct, District of Columbia, 1922	$198,547.69	
Increase compensation, Washington Aqueduct, District of Columbia, 1922	21,000.00	
Washington Aqueduct, District of Columbia, 1921	5,338.94	
Increase compensation, Washington Aqueduct, District of Columbia, 1921	34.84	
		224,921.47
		996,685.21

Balance June 30, 1922:		
Cash in Treasury of the United States	$244,373.75	
Cash in hands of the collector of taxes, District of Columbia	3,818.55	
Cash on requisition to the credit of the disbursing officer	62,882.76	
		$311,075.06
		1,307,760.27
Balance in the water fund, as above stated		311,075.06
Less obligations against appropriations:		
Water department, District of Columbia, 1922—		
Contingent expenses	507.06	
Maintenance and operation	36,496.45	
Installing water meters	84.00	
Extension of distribution system	22,798.68	
Installing fire and public hydrants	969.00	
Water department, District of Columbia, 1921—		
Contingent expenses	3.95	
Maintenance and operation	227.36	
		61,086.50
Unobligated balance		249,988.56

TABLE II.—*Cost of work done by the water department for the year ended June 30, 1922.*

Heads of expenditure.	Per diem and salaries.	Material expended, cuts and transportation.	Total expenditures.	Charge to general account.		Hauling and deposit accounts, Dr.
				Maintenance.	Extensions.	
Water surveys (detection of leaks)	$25,068.75	$3,368.40	$28,337.15	$28,337.15		
Maintenance of meters	18,192.35	5,762.46	23,854.81	23,854.81		
Installation of meters	12,894.89	18,740.63	31,535.52		$31,535.52	
Office of water registrar	68,714.88	4,079.02	72,693.90	72,693.90		
Inspection and repair of services	17,399.34	4,265.81	21,565.15	21,565.15		
Tapping water mains	5,457.51	9,332.06	14,689.57		14,689.57	
News service installed	271.27	126.18	397.45		397.45	
Engineering (field surveys)	23,220.27	3,807.98	26,928.25		26,928.25	
Hauling account	12,154.41	3,993.37	16,047.78			$16,047.78
Operation and repair of valves, fire hydrants, etc.	24,090.79	3,332.93	27,523.72	27,523.72		
Installation of fire and public hydrants	3,503.58	12,726.44	16,130.02		16,130.02	
Water mains laid	52,000.45	96,465.47	148,365.92		148,365.92	
Repairs to leaks	21,998.21	7,514.75	29,412.96	29,412.96		
Maintenance of reservoirs, lodges, and towers	3,591.10	637.17	4,128.27	4,128.27		
Care of grounds	7,660.05	66.48	7,626.53	7,626.53		
Repayment and deposit work	27,179.84	33,898.12	60,977.96			60,977.96
Replacement work, lowering mains, etc.	8,309.79	12,242.21	20,452.00	20,452.00		
Plans, estimates and tests	14,535.41	390.72	14,826.13	9,878.75	4,937.38	
Care of Bryant Street pumping station	24,328.38	3,888.38	30,116.76	30,116.76		
Operation and repair, pumps, Bryant Street station	46,294.94	95,277.13	141,472.07	141,472.07		
Operation and repair, pumps, Reno station	5,600.80	1,211.30	6,712.10	6,712.10		
Operation and repair, pumps, Anacostia station	8,978.15	3,651.80	12,629.95	12,629.95		
Shopwork	17,381.77	13,776.04	31,157.81	31,157.81		
Furnished other District of Columbia offices	4,126.42	33.33	4,159.75	4,159.75		
Gross expenditures	452,953.35	338,788.18	791,741.53	471,721.68	242,984.11	77,025.74

ame as last year when the population was 437,571, though the nean daily total consumption is about 1,800,000 gallons above the ame item last year.

The department has invited attention to the excessive use of water n quite a number of Government buildings but has not been very uccessful in securing a reduction to any appreciable extent in the uantities used.

The large fountains in the District of Columbia at very little expense could be equipped with electrically-controlled motor-driven pumps and filtered water could be used over and over again by means of these pumps with very little waste. There is no question in my nind but that these fountains would add greatly to the enjoyment of the public if some means, as suggested, could be used to place them n operation.

There are a number of places in buildings under control of both the Federal and District Governments where a more careful observation and supervision of the use of filtered water would be the means of eliminating much waste.

The department has under investigation the question of a high-pressure fire service for the business section bounded, roughly speaking, by First and Eighteenth, B and H Streets NW. Up to the present time our investigation of this matter is not in such shape as to allow a full report on same, but in a short time the department will be in a position to submit a report with an estimate of cost of the installation of this fire service; the idea being to build a pumping station at the foot of about Twelfth or Thirteenth Street, using electrically driven centrifugal pumps giving a discharge pressure of between 125 and 300 pounds over the area above mentioned.

In my opinion the most important main laid during the fiscal year was the 12-inch one in Sixteenth Street between I and U Streets NW. This main passes through a very important section where large apartments and residences were formerly supplied by 4-inch and 6-inch mains, these smaller mains being removed at the time of the laying of the 12-inch.

The department has under consideration the extension of pump service in the vicinity of the high points along Bennings Road east of the Anacostia River. A project for this extension will be forwarded shortly and will assist greatly in securing better service for this territory. Necessarily the scope of this extension can not be very extensive owing to restricted storage capacity in this area.

Attention is invited to the question of the disposal of valuable real estate, situated in square No. 175, now owned by this department. This property is in the block bounded by Sixteenth and Seventeenth, U and V Streets NW., and represents an investment of $66,500. This property is no longer used or needed by the water department, but is used by other departments of the District government. If sold, as suggested, the sum obtained could be used to advantage in making needed extensions of the distribution system.

I wish to record my appreciation of the work done by the employees of this department.

J. S. GARLAND,
Superintendent, Water Department, D. C.

ASSISTANT TO THE ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION.

A 16-inch water main was laid in Upshur Street between New Hampshire Avenue and Rock Creek Church Road NW. The laying of this main gives an adequate supply of water to the Soldiers' Home for fire protection, as well as a supplemental supply for domestic purposes adjacent thereto.

A 16-inch water main was laid in Kennedy Street between Illinois Avenue and Fourteenth Street NW. This main acts as a trunk as well as a service main, as it is fed directly off the 20-inch third high-service main in Illinois Avenue. It is proposed to extend this main from Fourteenth Street to Sixteenth Street in the near future.

Twelve-inch water mains were laid as follows:

Gallatin Street east from Sixteenth Street NW.
Sixteenth Street between Webster and Decatur Streets NW.
Webster Street west from Seventeenth Street NW.
Twenty-first Street south of B Street NW.
Fessenden Street between Wisconsin Avenue and River Road NW.
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[1] Stock meter. No meters were purchased during the year

storm-water sewers the problem of handling surface water is becoming more and more difficult. It is believed that a more liberal allowance should be made for the extension of the sewer system, and to permit keeping abreast of other developments it is suggested that possibly about 5 per cent of the entire District budget be allotted to the drainage system. In the past 10 years the ratio of sewer division appropriation to the total District appropriations has gradually been reduced from 4½ to 2½ per cent. More liberal funds would furthermore permit the construction of much needed relief sewers required to prevent the oft-repeated flooding of basements due to the overcharging of sewers. These overcharged sewers were constructed many years ago and though presumably designed according to the best engineering practice of that date, yet, under present-day conditions, with impervious street surfaces and closely crowded buildings, the run-off is so rapid that these sewers of "antiquated design" have proven of insufficient capacity. Many relief sewers, at a cost of many thousands of dollars, are urgently needed to relieve this repeated flooding of both public and private property alike. Washington is not alone in facing this condition of overcharged sewers, and, as a typical example, it may be mentioned that St. Louis is now spending hundreds of thousands of dollars to remedy similar evils.

Attention is also invited to the need of more vigorous prosecution in continuing work on the construction of the three principal interceptors, upper Potomac, Anacostia main, and Rock Creek, which will tend to eliminate the pollution of streams flowing through the District. Due to the increase of suburban population in near-by Maryland towns this pollution is rapidly increasing, and also in view of the great amount of sewer work now being undertaken by the Maryland authorities, and in line with the recent agreement prepared by the Commissioners of the District of Columbia and submitted to the Washington suburban sanitary commission of Maryland with the view to permitting the discharge from these Maryland sewers into District sewers, it seems but fitting that the necessary District sewers should be provided at as early a date as possible. There is yet required to be expended on the upper Potomac, Anacostia main, and Rock Creek main interceptors about $750,000 to bring these projects to completion.

In addition to the above the time is not far distant when work must be undertaken on commencing the Oxen Run interceptor, estimated to cost about $1,000,000. This interceptor is required to properly take care of a large area east of the Anacostia River now occupied by many dwellings and at this time without sewer facilities.

A serious situation facing this division is its inability to provide service sewers necessary in connection with building activities in progress or contemplated. During the fiscal year just ended building permits were issued to the unprecedented amount of $36,197,056, which exceeded by $13,537,604 any previous year. As a result of this enormous amount of new building, the fiscal year ended with $120,630 worth of service sewers ordered and not built.

The following is a summary of the sewerage and sewage-disposal systems, as of June 30, 1922:

	Miles.	
Length of sewerage system:		
Main sewers	152.31	
Pipe sewers	611.66	
		763.97
Length of sewage-disposal system		36.69
Total length		800.66
Cost of sewerage system		$15,412,515.28
Cost of sewage-disposal system		5,975,232.96
Total cost		21,387,748.24

During the past year the organization of the sewer division has been developed by placing employees in responsible charge of the various sections of this division. These employees have responded admirably and I have to acknowledge the efficient and loyal support accorded the writer which has rendered possible any accomplishments achieved by this division. To foster the spirit of teamwork, the section heads meet informally with the sanitary engineer once each month to discuss matters of interest to the division.

A brief outline of the year's activities are recorded by sections, as follows, the detailed reports of the section heads being filed in this office:

SECTION OF OFFICE ENGINEERING, A. D. BLACK, PRINCIPAL ASSISTANT ENGINEER, IN CHARGE.

The work of this section comprises the computing, designing, and drafting work incidental to studies for new construction, repairs, or improvements, and for future extensions of the system. This section also has jurisdiction over the mapping work of the division; the filing system of drawings and records, and undertakes the furnishing of information to the public as to availability, location, etc., of existing sewers as required in connection with building activities.

During the year detail studies were made in connection with 707 jacketed files, requiring the preparation of 96 drawings. The system of record maps was extended by the addition of 6 new maps, and in addition 4 old maps were replaced, as were 23 working maps which had worn out. All maps were kept posted throughout the year by plotting thereon new sewer work, 1,054 new subdivisions, alley closings, etc.; 219 studies of street grades as prepared by the engineer of highways (these grades having first been submitted to this office for study as to effect on the drainage system), and also location of new building construction. Four hundred and thirty-nine plats were forwarded to the assessor showing pending sewer assessment, connection of parcel property with service sewers, subdivision of parcel property abutting service sewers, and where trunk sewers were construed as service sewers. Thirty right-of-way deeds with accompanying plats were prepared, 16 of which were acquired. Thirty contracts were prepared, involving the accompanying drawings and estimates of quantities. In addition, card records of the various activities of this section were maintained. Through this section has been initiated the system of standardizing the size of all drawings, which system has been incorporated in "Office procedure" for the fiscal year 1923; and also through this section has been initiated the

practice of printing border and title block on standard blanks for drawings, thus greatly increasing the efficiency of the drafting force by the elimination of the laborious work of penning an elaborate title.

In advance of all surface work a study is made of sewer requirements and to prevent future cutting of new paving such sewer work as is necessary is undertaken. During the year this involved 28 such studies.

The work handled by this section is by far the most exacting of that required by any section; and the large part of the activities of this division are dependent upon the conduct of this office. With the low salaries available it is practically impossible to obtain the services of technically trained men required for the proper handling of this work, and great credit is due the present personnel of this force for the work that is actually performed.

The outstanding need of this section is the creation of a subsection of computing to permit of an intelligent study of the very important question of drainage and sewer sizes; but great difficulty has been experienced in obtaining the services of properly qualified men with the necessary education and knowledge of mathematics and hydraulics required to undertake this work.

SECTION OF SURVEY AND CONSTRUCTION ENGINEERING, C. C. BADEN, ASSISTANT ENGINEER, IN CHARGE.

The work of this section covers the supervision of all contract work and the preparation of payments for same; the staking out of all work done by day labor; all preliminary and detail survey work required in connection with office studies; and special reports based on field inspections and necessary field data.

Work done under 26 contracts involved 3.3 miles of sewers at a cost of about $165,000, as follows.

Of contracts awarded during the fiscal year 1921 all were completed, as follows: Spring Road relief sewer in Thirteenth Street between Spring Road and Upshur Street; Eighth Street service sewer between Buchanan and Decatur Streets; Varnum Street service sewer, between Sixteenth and Seventeenth Streets; Morris Road service sewer between Bryan Place and Pomeroy Road; upper Potomac interceptor, section 4, west of the Aqueduct Bridge.

The contracts awarded during the fiscal year 1922 and entirely completed during the year are enumerated as follows: Thirty-ninth Street trunk sewer outlet, through square 1857; Piney Branch trunk sewer, section 11, between Illinois Avenue and Seventh Street; Macomb Street trunk sewer, section 4, in Newark Street between Thirty-fourth and Thirty-sixth Streets; Seventeenth Street relief sewer, between P and Corcoran Streets; Dalecarlia intercepting sewer, section 3, in grounds of the Dalecarlia Reservation; outlet, Petworth Valley trunk sewer, section 4, crossing Fourteenth Street in line of Varnum Street; T Street trunk sewer, section 2, between Fourteenth and Sixteenth Streets; outlet, Illinois Avenue trunk sewer, crossing Gallatin Street in line of Ninth Street; Good Hope Run trunk sewer, section 3, in Seventeenth Street and alley of square 5613; Alabama Avenue southeast service sewer, between Tenth Place and Logan Place; Kansas Avenue relief sewer, in Shepherd Street and alleys of

square 2907; Newark Street combined system sewer, between Reno Road and Thirty-third Place; Connecticut Avenue service sewer, between Cathedral Avenue and Jewett Street; Kentucky Avenue service sewer, between C and D Streets; Pinehurst service sewers in Tennyson and Thirtieth Streets; Bladensburg Road and Twenty-eighth Street service sewer, in Channing Street, Bladensburg Road and Twenty-eighth Street; Allison Street service sewer, between Sixteenth and Seventeenth Streets; and Ingomar Street service sewer, between Forty-second and Forty-third Streets.

Contracts for Monroe Street service sewer, between Eighteenth and Twentieth Streets NE.; Thirtieth Street service sewer, between Albemarle and Brandywine Streets; and Grant Street service sewer, between Minnesota Avenue and Forty-second Street, were partly completed during the fiscal year.

Contracts let during the fiscal year, on which no work was done, are: O Street replacement sewer, between First Street and New Jersey Avenue; Broad Branch trunk sewer, section 1, in Nevada Avenue between Chappel Road and Legation Street; Stephenson Place service sewer, between Thirty-second Place and Utah Avenue; Quesada Street service sewer, between Western Avenue and Broad Branch Road; M Street relief sewer, section 1, between Twentieth and Twenty-second Streets; Seventeenth Street and Otis Street service sewer, NE.; Allison Street and Eighteenth Street service sewer, and new invert, Indiana Avenue trunk sewer, between First and Third Streets. This latter contract is the most important betterment of the sewerage system provided for during the year.

This contract work necessitated the preparation of 30 measurement sheets. Sewer construction under day labor, requiring the necessary staking out, amounted to over 10 miles. As a record of new construction, 162 detailed record sheets were prepared. In addition, some 20 miles of profiles were run and plotted, required in connection with office studies.

It should be noted that the only work done toward completing the interceptors of the sewage disposal system already under way was the construction of 314 linear feet of the upper Potomac interceptor, at a cost of $4,885.71.

One hundred and eleven plats were furnished the assessor showing in detail the locations of new service sewers, and 6 letters were forwarded to the health officer indicating the location of new sewers where same abutted existing houses. One hundred and seventy-five special reports were made on applications for the connection of area drains to separate system sewers.

The work of this section has increased to such an extent during recent years that the present force is hardly more than able to keep pace with current work. The creation of an additional field party with necessary transportation is greatly needed in order to facilitate the making of preliminary surveys in the rapidly developing outlying districts.

SECTION OF DAY LABOR CONSTRUCTION, T. LANIGAN, OVERSEER, IN CHARGE.

The work of this section covers the construction of all new sewer work not contracted for, and all basin work and necessary repairs.

During the fiscal year 1.54 miles of main sewers and 8.62 miles of pipe sewers, a total of 10.16 miles, were constructed. This construction was distributed rather evenly throughout the District, as indicated below:

	Miles
Within old city limits	1.10
County west of Rock Creek	2.91
County east of Rock Creek	3.31
County west of Anacostia River	1.39
County east of Anacostia River	1.41

In addition to new sewer work, 83 storm water catch basins were constructed during the year and 588 minor repair jobs were undertaken.

On account of the greatly scattered area in which work must be performed, it is necessary to maintain 5 construction gangs under competent foremen, and in that gangs must often be split for work in two locations simultaneously, each gang is provided with a timekeeper qualified to act as subforeman. It is felt that if the restriction confining day labor work to the smaller jobs estimated to cost $1,000 or less was removed, the overhead charges on day labor construction could be reduced materially by assigning larger gangs to the above foremen, thus permitting a permanent splitting of gangs, one to be supervised by the subforeman.

In two instances during the year especial authority was granted by the commissioners to execute by day labor jobs estimated to cost in excess of $1,000. This work consisted of the junction chamber in the Slash Run trunk sewer at Twenty-second and M Streets, necessary to afford an outlet for the proposed M Street relief sewer, at a cost of $3,924.99; and the concrete lining in Potomac Street trunk sewer under the Chesapeake & Ohio Canal, necessary to exclude large quantities of canal water leaking into the sewer and requiring to be pumped at Rock Creek substation and again at the main pumping station, at a cost of $1,751.19.

The outstanding need of this section is motor transportation to replace horse-drawn vehicles now used by the overseer in charge of repair and betterment work, and by the general timekeeper of this section, who also acts as assistant to the general foreman and in the absence of the latter substitutes for him. A further need is an additional motor truck.

SECTION OF CHIEF CLERK, J. H. DICK, COMPUTER, IN CHARGE.

The work of this section covers the preparation of pay rolls, requisitions and vouchers, material and equipment accounting, cost keeping and general records. In addition, this section prepares monthly financial statements to permit a study of available balances. In that all unexpended balances on June 30 revert to the United States Treasury unless previously obligated, it is essential that a close watch be kept over the finances to prevent the forced lay-off of employees from lack of funds, or the reverting of moneys appropriated for much needed sewer activities. As a result of this phase of the work, the unexpended balances of the construction and maintenance appropriations for the fiscal year 1922 were zero.

The work of this section covered the following expenditures from 1922 appropriations:

Cleaning and repairing sewers and basins	$80,000.00
Operation and maintenance of the sewage pumping service	98,000.00
Main and pipe sewers and receiving basins	120,000.00
Suburban sewers	225,000.00
Assessment and permit sewers	157,000.00
Purchase or condemnation of rights of way	3,642.20
Miscellaneous trust fund deposits	12,459.96
Miscellaneous appropriations	12,279.59
Total	708,381.75

The annual inventory report of all expendable and nonexpendable material and equipment was forwarded, as were the quarterly reports of cost of operation, repair and mileage of the 12 motor vehicles maintained by this division. Daily reports were prepared showing the various activities of the division. A total of 69,101 reports and records were handled by this section.

During the year this section moved to new quarters, room 311, and in addition to vacating much needed space, this force is now more conveniently situated for the performance of their duties.

Adopting a policy of penalizing annual leave for sick leave taken, except in cases of serious and protracted illness, has possibly been responsible for the salutary effect of reducing sickness in the office force by about 18 per cent over the previous year.

SECTION OF OPERATION AND MAINTENANCE, H. GARNER, INSPECTOR, IN CHARGE.

The work of this section covers cleaning storm-water outlets, collecting rainfall data, recording flow in sewers, annual inspection of trunk sewers, inspection and maintenance of sewage regulators, sumps and tide gates, investigating complaints, basin cleaning and flushing, and flushing and cleaning pipe sewers.

With the combined system of sewers as operating in Washington it is necessary to clean storm-water outlets after each storm, since diluted sewage, discharging at these points, would become offensive if the conditions existing at the outlets after storms were not attended to. Notable examples of such outlets requiring attention are in Piney Branch valley just west of Sixteenth Street, which required cleaning 105 times during the year, also at Sargent Road and Bunker Hill Road, and at Stickfoot Branch crossing Howard Avenue. In addition, to enable the sewers to properly function, it is necessary from time to time to remove the large quantities of sand and gravel that is deposited in gravel basins and inverted siphons and back of the dam across Rock Creek just below Massachusetts Avenue.

Data for run-off studies were gathered from 4 automatic and 21 pot gauges located throughout the District. In making studies, with a view of taking care of excessive rainfall, it is essential that the rate of precipitation be known, and, since the pot gauges register the total fall only it is felt that additional automatic gauges are badly needed.

During the year there was but one storm of excessive precipitation, occurring on July 15, 1921, which, as reported by the United States Weather Bureau showed a maximum precipitation during 5 minutes

at a rate of 7.92 inches, during 10 minutes of 6.78 inches, during 15 minutes of 5.88 inches, and during 20 minutes of 4.74 inches. As a result of this storm most of the sewers in the city were overcharged, flooding the streets in the low areas and causing the water to back up in the basements of many houses. A storm was experienced on July 11, 1921, which, while not considered excessive, caused the death of two little children who were playing in an open drain in the grounds of the Soldiers Home and who were caught in the flood of water caused by the sudden rainfall and swept to their death in the sewer. The inlet to this sewer has since been protected.

To determine the flow in trunk sewers during excessive storms, with a view of a study to relieve the overcharging of same, cup gauges are installed in the sewers at strategic points. During the year the number of such gauges was increased from 21 to 99 and much valuable information is being obtained therefrom. It is proposed to install many more such gauges in the future.

At a cost of $1,200.70, an inspection was made of the interior of 125 miles of the 192 miles of trunk sewers in the District and same were found to be structurally good. As a result of this inspection 86 minor repairs were found to be necessary. The outstanding results of this inspection were found to be an accumulation of silt, 33 inches deep in one sewer and in several instances 24 inches deep. This silting up of sewers was found to be more or less general, creating a very serious condition, especially in view of the inadequacy in size of sewers which are subject to overcharge in times of severe storms. A very urgent need of this division is an additional appropriation of $16,500 for the employment of the necessary force to properly clean these trunk sewers and maintain same free from deposits.

Four thousand eight hundred and twenty-nine inspections, at a cost of $3,388.23, were necessary in connection with maintaining the 17 sewage regulators, 95 sumps, and 63 tide gates in the sewerage system. These appurtenances are theoretically automatic in their operation; but trash washed down with each rain so interferes with their operation that in order to insure satisfactory results constant supervision is necessary. The proper functioning of these appurtenances is necessary to divert sewage to the pumping station and to prevent storm and river water from being carried to the pumps. The territory covered by this activity extends over the entire District, and automobile transportation should be substituted for horse-drawn transportation of this outfit, which would result in a greatly increased efficiency.

One thousand and sixty-one complaints were investigated and acted upon. These complaints were made up, the most part, of obstructed house connections and catch basins and offensive odors arising from dead animals which had been thrown into basins. These complaints have increased about 100 per cent in the past two years, and it is becoming more and more difficult to handle this service with the slow-moving horse-drawn transportation furnished the inspector in charge of this work.

A total of 21,165 city basins were cleaned at a unit cost of slightly less than $1, this cost including labor and team hire but not disposal; 5,202 cubic yards of sludge being removed from same. In the county 4,022 basins were cleaned of 3,300 cubic yards of sludge at a

unit cost of $1.35. In the summer the force on this work is increased to cope with the great amount of sand and gravel washed into the basins by the heavy storms. It is the hope of this division to soon motorize the city basin cleaning outfit, and, it is believed that the purchase of five 1-ton Ford trucks to replace the 10 horse-drawn vehicles now operating would result in a saving in operating cost during the first year that would more than pay for the complete initial cost of the five trucks. At a later date it is the idea of this division to motorize the county basin cleaning activity by the substitution for the 2-horse dump wagons of a 3-ton dump truck. On June 30, 1922, there were 6,302 catch basins requiring cleaning.

Ink sludge collected in the settling basins at the Bureau of Engraving and Printing was removed and disposed of by this division. Six hundred and ninety-six and five-tenths cubic yards of this material was removed; the cost of this work, $2,811.13, being reimbursed by the bureau.

During the summer months it is necessary to flush all catch basins, thereby replacing the stagnant water required to seal basins against the sewer gases. This flushing is necessary in order to keep down offensive odors. At the time of flushing a small amount of oil is poured into the basins to prevent the breeding of mosquitoes. During the year 13,829 basins were flushed.

The work of pipe-sewer flushing consisted in the flushing of over 1,000 miles of pipe sewers to remove any solids that may have collected due to insufficient flow. This work represented an expenditure of $4,576.85. This flushing is necessary to prevent an insanitary condition. There are 615 miles of pipe sewers in the District requiring flushing as above.

During the fiscal year, 32 miles of pipe sewers and 81 basin outlets were cleaned of 176 cubic yards of sand, gravel, and tree roots which were obstructing the flow. Cost of this activity, $8,777.96. The force engaged upon this work is handicapped by not being supplied with a modern equipment, and it is estimated that by an expenditure of $1,500 for a modern sewer-cleaning machine a saving of over twice that amount could be effected in the first year of operation.

In conjunction with the removal of snow from the street surfaces, manholes over sewers were made available for the dumping of snow. To prevent congestion in manholes and in the sewers, it was necessary to have an inspector at each dumping place. On the occasion of the heavy snowfall of January 28, 1922, 30 manholes were in service for the above purpose, requiring the services of 23 inspectors. In this cleaning 39,072 cubic yards of snow were dumped into the sewers.

The principal handicap against which this section is struggling is lack of motor transportation for the inspector in charge of these various activities. With his present horse-drawn vehicles it is physically impossible for this inspector to properly supervise all of these activities for which he is responsible.

SECTION OF PUMPING SERVICE ENGINEERING, R. S. CHAPIN, ASSISTANT ENGINEER, IN CHARGE.

The function of this section is the keeping of records of performance of the mechanical equipment of the main sewerage pumping station and substations; the records of rainfall as affecting the operation of

storm water pumps; records of river flow and study of sewage dilution of the river; record of tides, etc. Also a study is now in progress to best show graphically the performance records at the station. This section, in addition, is making a study of the most modern methods practiced in the best equipped plants as well as a general theoretical study looking toward greater efficiency.

As a result of above studies there has been a gradual reduction in the consumption of coal, brought about by the hearty cooperation of the master mechanic in applying his wide practical experience to the carrying out of suggestions, the conclusions of theoretical studies.

As a direct result of these studies old and leaky steam valves have been renewed, the boilers in service have been reduced from two to one, boilers have been generally overhauled and a steam fitter has been assigned to the upkeep of same. In addition, work on the lagging of steam mains has been commenced. Further improvements are contemplated after a more thorough study and a further material reduction in operating costs is confidently looked for in the future, which will make this section of ever-increasing value to the division, both for economy and efficiency.

The maximum range of the tide of the river as indicated on automatic gauge was 4.4 feet. The river flow in second-feet varied from a minimum of 1,850, occurring October 17, 1921, and November 19, 1921, to a maximum of 78,000 recorded March 17, 1922; with a mean flow throughout the year of 11,130.

A study as to the dilution obtaining in the Potomac River due to discharge therein of sewage, indicates the following comparison with other recognized standards.

For the purpose of this comparison, the dilution is expressed as the flow in cubic feet per minute required to dilute the sewage of each 1,000 of population. The population of the District is taken at 437,571 and the flow of the Potomac 2,100 second-feet, the lowest average flow over a seven day period as recorded during the fiscal year (week of August 28–September 3):

Flow per 1,000 population:	Cubic feet per minute.
Potomac River	288
Chicago Drainage Canal	168–216
Minimum requirement for Chicago Drainage Canal as ruled by the Secretary of War	100
Requirements of committee of American Public Health Association	240–360
Requirements as stated by Mr. Langdon Pearse in proceedings of the American Society of Civil Engineers, December, 1921 (temperature of water 77°)	329
Requirements of English Royal Commission	1,667

The total pumpage in gallons for the year is shown as follows:

	Storm water.	Sewage.	Total.
Main sewerage pumping station	2,319,731,496	24,906,695,603	27,226,427,099
Poplar Point substation		821,735,317	821,735,317
Rock Creek substation		125,879,731	125,879,731
Woodridge substation		15,293,400	15,293,400
Total	2,319,731,496	25,869,604,051	28,189,335,547

Eliminating Rock Creek and Woodridge substations, which deliver their discharge to the main sewerage pumping station, the above *would indicate* a mean daily pumpage of sewage of 70,488,852 gallons.

To permit the burning of a grade of coal inferior to Georges Creek coal as used in the past, studies are being made toward possibly increasing the combustion chamber of the boilers by lowering and bringing forward the grates. As an assistance in this study, advantage is being taken of the experience of the Westinghouse Electric & Manufacturing Co. and the M. H. Detrick Co., with an idea of reaching a solution to prevent the constant burning out of grates and also to eliminate the smoke nuisance which has given rise to several complaints from the District of Columbia health officer.

The greatest need of this section is an additional computer and draftsman to relieve the assistant engineer in charge and allow him more time to make studies of modern methods and to come more directly in contact with the actual operating conditions.

SECTION OF MASTER MECHANIC, F. K. STEELE, PRINCIPAL STEAM ENGINEER IN CHARGE.

The duties of this section consist in the maintenance and operation of the steam-driven main sewerage pumping station, and the electric driven Poplar Point, Rock Creek, and Woodridge substations. In connection with the maintenance and operation of these stations this section maintains a machine shop and a blacksmith shop; and, in addition to the operating force, employs electricians, steamfitters, screen operators, cleaners, and general utility men; a total force of 52.

During the year new valves were installed on steam lines between the main steam line and the 8 storm water pumping engines and the 4 sewage pumping engines. The side and bridge walls, Detrick arches, and stoker interiors were renewed in two boilers and 238 tubes replaced in the 6 boilers. New blow-off valves were installed on all 6 boilers, and 8-inch gate valves were renewed on steam lines between the 6 boilers, and the main header. Two boiler feed pumps, two Rooney stoker engines and ventilating fan engine were thoroughly overhauled. All steam mains were repaired and the hydraulic sludge press in screen room was overhauled. The chute from coal crusher to conveyor and from conveyor to scale hopper was renewed. In addition to above renewals, the pumps, engines, and generators were kept in repair; the principal items of repairs being as follows: Casting, machining, and installing new bronze sleeves as renewals on impeller shaft at pump stuffing boxes on sewage engines Nos. 1 and 2, Class I; casting, machining, and shrinking bronze sleeves on pump plungers; the casting, machining, and installing of new bronze sleeves as renewals on impeller shaft at stuffing box on Class II engine; installing Trips metallic packing in the high pressure piston rods of Class I engines; rebabbitting and fitting crosshead bearings on Class II engine; making and installing new oil guards and rings in thrust bearing on No. 1 engine, Class I; rebabbitting crosshead guide bearings and refitting pins on generator engine No. 2; and making and installing new high and low pressure steam valve stems for generator engines Nos. 2 and 3.

At Rock Creek substation new electric level indicators were installed; also metal screen doors.

As a precaution against accidents the Otis elevator at the main sewerage pumping station was equipped with a locking device and with semiautomatic lock gates at all floors. To permit withdrawing

the elevator from passenger use a stairway was installed at the north end of building between basement and ground level floors. This stairway was incased to prevent the permeation of odors throughout the building at times of cleaning the sediment chamber.

The total coal consumed at the main sewerage pumping station during the fiscal year amounted to 5,963 tons. Coal on hand July 1, 1921, 1,015 tons; coal received during fiscal year 5,638 tons; coal on hand June 30, 1922, 690 tons. Value of coal purchased $45,212.50; value of coal used $47,818.75.

Of the coal purchased, different coals were received as follows:

	Tons.
New River, run of Mine	2,582
Georges Creek, run of mine	3,056

With New River coal, especially, great difficulty was experienced in the burning out of grate bar webs, grate bars, fuel plates and grate-bar fingers; necessitating replacements costing $1,318.56. This burning out of 5,000 fingers, especially, was unquestionably due to the low ash in New River coal. Throughout the year this question was given much study and various experiments undertaken as to rearrangement of grate surface. It is believed that this evil has now been somewhat reduced as the result of decreasing the load on the boilers, this being made possible through attack on leaky steam mains, unclean boilers, etc.

Beginning January, 1922, the dates for sediment chamber cleanings were predetermined, time based on low tides to permit disposal of sludge. This schedule calls for a cleaning at the main station once a month and at Poplar Point alternate months. During the fiscal year 1922, 8 cleanings were made, averaging about 5 days per cleaning. A total of 2,085 cubic yards of sludge was removed. At Poplar Point substation the sediment chamber was cleaned 5 times during the year, removing 192 cubic yards of sludge.

Débris removed from the screens amounted to 586 tons. These screenings were pressed in the hydraulic sludge press to free same from water and were then incinerated.

An unfortunate situation existing at the main sewerage pumping station is that, owing to insufficient appropriation, the operating force—all statutory employees—are required to work on a seven-day week basis instead of a six-day week as is required of all other statutory employees in the District service. This condition has gradually been breeding discontent which in turn might breed inefficiency and lack of an "esprit de corps." January 1, 1922, a new schedule was tentatively placed in effect of reducing the operating force from 6 to 5, which permitted the men to avail themselves of their 30 days' annual leave, and, in addition, gave them one day off duty on an average of about every 10 days. The above days off duty were reduced by the amount of any sick leave granted throughout the year. This reduction in the personnel of the operating force is considered an unfortunate necessity in that with such a reduction it becomes more and more difficult to maintain the desired efficiency of this plant. Apparently as a direct result of the placing in effect of this schedule, the sick leave taken by the operating force reduced 60 per cent in the latter half of the fiscal year as compared with the same period in the previous year.

While there are many wants at the stations, notably replacements of worn-out units, it is believed that the greatest need is provision for a swing watch, to permit the employment of a full operating force and at the same time grant the men one day off a week.

SECTION OF SHOPS AND YARDS, W. M. BYRNES, ASSISTANT ENGINEER, IN CHARGE.

The work of this section covers the care of greenhouse and lawns, the manufacture of basin tops, field blacksmith shop, automobile repair shop, paint shop, carpenter shop, and the removal of waste from the sewerage system by water to point of disposal. This section also has charge of the rolling stock, and floating equipment, including marine railway and such stock of material as it is necessary to carry in this division.

In connection with the upkeep of lawns it is believed that a factor in the upbuilding of the morale of the 76 white employees engaged in the vicinity of the sewer division yard at First and O streets SE., would be to build one or more tennis courts for the use of employees. The cost would be very small, and is, it is believed, well worth the investment.

For inclusion in the sewer system, there were constructed under this section 253 catch basin tops with their necessary drip stones and cheek blocks, at a cost of $10.15 per basin.

The field blacksmith shop made the 78 cup gauges that were installed in the trunk sewers throughout the year, 8 basin cleaning tanks were rebuilt, and 78 wagons, buggies, and other rolling stock were kept in repair as to iron work and 4 autotruck bodies were ironed. All construction tools were kept in condition.

Under the paint shop 41 vehicles were painted, together with all floating equipment, also the 2 portable derricks and 2 watch boxes. All buildings in the yard were painted and many miscellaneous jobs were undertaken.

Under the auto shop hydraulic hoists were installed on two 2½-ton Republic trucks and these trucks placed in service on construction work. At the time of the Knickerbocker Theater disaster this organization was called upon to help remove débris, and, calling upon the United States Motor Corps and the District of Columbia surface division for the loan of trucks and wagons, this division hauled about 84 tons of heavy iron beams and girders and large pieces of concrete and plaster to a near-by dump.

Under the carpenter shop all construction forms, for use in connection with trunk sewers built by day labor, were made. The tugboat was overhauled and 4 scows were repaired. The rolling stock was kept in repair as to carpentry work and new bodies were built for 4 autotrucks and 2 field cars.

In connection with the removal of waste by water, it became necessary to thoroughly overhaul the tugboat at an expenditure of $1,384.64. This work withdrew this boat from service for 49 days, requiring the discontinuance of sediment chamber cleaning and ash removal. It is believed that from this date it will be more and more difficult to obtain uninterrupted service from this boat and it is felt imperative that sufficient funds should be provided for the purchase or building of an auxiliary tow boat, since in case of a serious breakdown, the

rental of a tug to perform this very necessary work would be in the neighborhood of $45 a day. In addition to work on the tug it was necessary to repair 4 scows at an expenditure of $917.15. The scows, 8 in number, are fast deteriorating due to lack of repairs and renewals, and the necessary funds should be provided for establishing a definite policy of rebuilding one scow each year until this floating equipment is in proper condition. The above floating equipment is principally employed in transporting sludge from basin cleaning tanks, sludge from sediment chamber cleanings and ashes from the main sewerage pumping station to the point of disposal. These wastes are deposited as back fill behind the sea wall of the Anacostia River improvement, under permit from the United States Engineers' Office.

At the present time there is at the First Street yard a steam-operated hoist, elevated railway and dumping car installed in 1911 at a cost of something over $3,000. This equipment is now greatly in need of repair, requiring an expenditure estimated at about $2,000. This equipment was installed for the purpose of receiving sand, gravel, and brick directly at the sewer division yard. In view of the fact that material can be drawn from the District of Columbia property office yards at a reduction estimated at 15 per cent less than the same material can be supplied through the sewer division yard, it is believed that to repair this equipment is unjustifiable and it is proposed to scrap same, reclaiming any machinery worth while. Rentals received on dredge, marine railway, and pumps amounted to $577.64 during the year, or more than sufficient to keep same in thorough repair. A much-needed addition to this yard is a tractor for hauling lumber and reinforcing steel and also for transporting portable derricks, concrete mixers, etc., to various construction points throughout the city. Had such a tractor been available at the time of the Knickerbocker Theater collapse it would have rendered excellent service.

Probably the greatest need of this section is appropriate and sufficient housing for the motor vehicles of this division. At the present time the trucks are stored under open sheds exposed to the weather, and during the winter every precaution is necessary to to prevent freezing. Plans are now in course of preparation for a garage of light construction which may be enlarged as occasion demands.

SECTION OF UNDERGROUND CONSTRUCTION, PUBLIC SERVICE CORPORATIONS, A. G. DUNN, ASSISTANT ENGINEER, IN CHARGE.

The work assigned this section involves detailed determination of locations for new extensions of gas mains, electric, telephone, and telegraph conduits, with their accessories, as well as supervision of the work done under permits therefor, and the accurate location of all work. Applications for these new constructions require careful location studies so as to avoid interference with existing and future construction, and particularly to assure economical and orderly occupation of public space along predetermined systematic lines. During construction the work is regularly inspected, compliance with the terms of the permit is insisted upon, and an accurate record of the location of all work is obtained from field measurements. Record

sheets are prepared showing the work in detail, and the work is then plotted on record maps and recorded on card system.

The work of the year may be summarized as follows:

Permits prepared upon application		2,643
Gas mains laid	miles	9.90
Electric conduit laid	do	10.10
Telephone conduit laid	do	6.45
Telegraph conduit laid	do	0.01
Traction company conduit laid	do	1.97
Manholes constructed		1,371
Houses connected with gas mains		848
Houses connected with electric light and power		2,291

In addition to the current work of the year 11 new record maps were made, thus extending the area mapped for this activity. However there is a great need of a complete set of gas and conduit maps for this section, in that less than half the area is now covered and many of the existing maps are badly worn.

In advance of all proposed surface work, a study is made of existing and needed conduits, and where considered advisable, recommendation is made to the Public Utilities Commission that the respective corporations be required to install same.

Following is a statement of the amounts charged each of the several public service corporations for supervision and inspection on account of underground construction during the fiscal year:

Washington Gas Light Co.	$893.09
Georgetown Gas Light Co.	205.68
Potomac Electric Power Co.	1,728.56
Chesapeake & Potomac Telephone Co.	697.79
Postal Telegraph Co.	1.58
Capital Traction Co.	274.58
	3,801.28

By a small change in method of handling applications for permits, it is estimated that an annual saving of about $400 has been effected.

The greatest need of this section is motor transportation for the section-head, this vehicle also to be used, when occasion demands, by his inspector. For want of this much-needed transportation it is becoming more and more difficult to make the necessary intelligent studies for proper locations.

J. B. GORDON,
Sanitary Engineer.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, *September 15, 1922.*

SIR: I have the honor to submit the following report of the operations of the electrical department for the fiscal year ended June 30, 1922:

STREET LIGHTING.

The street-lighting system has been maintained and additions and extensions of minor sort to meet pressing demands and needs in newly occupied unlighted streets, etc., have been made about on

the same basis as in the next preceding year, and at some especially necessary points the size of existing lamps has been moderately increased. Of an increase of $15,000 in appropriation, approximately $6,000 was not expended for reasons stated below.

The distribution of street lighting throughout the area and the logical relation of parts is believed to be better than in most cities, but the need of a higher degree of illumination and of visibility practically throughout is again cited with an increase of emphasis. Reference is made to report of the electrical engineer for the fiscal year ended June 30, 1920. Instead of being somewhat favored, as might seem to be justified by the character and peculiarities of the city, the grade of street lighting and the expenditure for lighting in Washington are very far below the best and much below an average of cities comparable in population and mileage of streets. Plans and studies are being made of methods of greatly improving the degree, the effectiveness, and the efficiency of lighting at a less increment of cost. This involves both selection and design of some different equipment to supplement the existing and to avoid scrapping the existing. Changes needed but which would probably have conflicted with the contemplated scheme were deferred.

The net increase in number of lamps of all kinds is 366, compared with 342 in 1921. Of the 603 lamps newly connected (gross), 337, or about 56 per cent, were either "designation" lamps or the lowest-powered gas or electric. The increase in aggregate candlepower of the street lighting system is from approximately 1,707,200 to approximately 1,752,100, about 2.6 per cent.

ARC LIGHTING.

This system has been affected by the addition of one 6.6-ampere and three 4-ampere magnetite arc lamps, to a total of 783 arc lamps connected June 30, 1922, as compared with 779 at the close of the preceding year.

One 6.6-ampere arc lamp was moved and one added to improve a detail at southwest corner of Thirteenth and F Streets NW. Two 4-ampere arc lamps were added at and near the corner of Florida Avenue and North Capitol Street, and one on Florida Avenue between Seventh and Eighth Streets NW. for same reason.

INCANDESCENT ELECTRIC LIGHTING.

The number of incandescent lamps added is 320, discontinued 120, a net increase of 200, being 75 of 250 candlepower, 16 of 100 candlepower, and 109 of 60 candlepower; 67 of the 250 candlepower were by change from 60 and from 100 candlepower. The largest new installations were of ten 100-candlepower lamps around Iowa Circle, replacing gas lamps formerly maintained through the Office of Public Buildings and Grounds, eight 100 candlepower in isles of safety in roadway about Scott Circle, and sixteen 60-candlepower, Alaska Avenue, Sixteenth Street to Georgia Avenue. The remainder of increase was by widely scattered installations of five and less.

The total number of electric incandescent lamps connected June 30, 1922, was 8,606, compared with 8,406 at the close of the preceding year.

MANTLE GAS LIGHTING.

The number of mantle gas lamps added was 269, discontinued 116, a net increase of 153. The entire 116 discontinued (60 candlepower) were replaced by 117 (of the gross added, 269) of double-burner, inverted, of 120 candlepower.

The largest new installations were of 17 single burner about the new development of square 3557, Second, Third, Adams, and Bryant Streets NE.; 7 similarly at square 3014, Eighth, Ninth, Buchanan, and Crittenden Streets NW.; and 7 at a highway improvement, North Carolina Avenue, Sixth and Seventh Streets SE., the remainder in single lamps and small groups, widely scattered, including 47 in alleys; no gas lamps were replaced by electric lamps.

The trial change of equipment to double inverted (120 candlepower) at intersections and to single inverted (60 candlepower) intermediate, notably in K Street NW., First to Twenty-second Street; Rhode Island Avenue NW., First to Twelfth Street, and North Capitol Street, Truxton Circle to Michigan Avenue, has proven a notable improvement in effectiveness of lighting, with moderate increase of annual cost.

The total gas-mantle lamps connected June 30, 1922, was 10,734 (10,617 60-candlepower, 117 120-candlepower) compared with 10,581 (all 60-candlepower) at the close of the preceding year.

DESIGNATION LAMPS.

The number of designation lamps added was 10, 4 gas and 6 electric, and the number discontinued was 1 electric, a net increase of 9. The one discontinued was a special equipment traffic warning lamp in base of lamp-post, replaced by a traffic warning fixture of other design, equipped with larger lamp.

The total of designation lamps connected June 30, 1922, was 585 (401 gas, 184 electric) compared with 576 (397 gas, 179 electric) at the close of the preceding year.

TRAFFIC LIGHTS.

Trial installations have been made of a few lights for traffic guidance purposes; at the permanent street-car loading platform in Fourteenth Street NW., between G Street and New York Avenue, (4); at isle of safety intersection Massachusetts and New Jersey Avenues, (1); at isle of safety Sixteenth Street north of Columbia Road, (2); and at northwest side Sheridan Circle, (1); a total of 8, lamp-posts have been specially equipped to design by the electrical engineer, District of Columbia, with colored glass "bull's-eye" lens or lenses (1 to 5) mounted in face or faces of octagonal base of lamp-post, District of Columbia design No. 15, transmitting light from lamp within the base; the post carrying also at top in usual manner a typical lamp; the bull's-eyes are disposed directionally to warn traffic near at hand and that approaching from all legally possible directions; also, at Seventeenth Street and Park Road (1); Sixteenth Street and Columbia Road (1); and in roadway around Scott Circle, (2); a total of 4, special fixtures (commercial product), analagous to the widely used "mushroom" but illuminated by inclosed lamp, have been installed. These are all considered serviceable and of

public-utility companies have resulted in an aggregate net increase during the year of 912 poles (804 line, 108 guy), bringing the record total of all electric poles on June 30, 1922, to 20,914 (19,690 line, 1,224 guy). The list of pole owners comprises the United States, the District of Columbia, and 17 companies (the steam railroads being lumped as one); more than 75 per cent of the poles are owned by, and nearly 99 per cent of the year's increase is by, two of the companies. The increase, 912, compares with 348 of the preceding year. It was a year of exceptional activity due, no doubt, to the exceptional suburban development. The number of telephone poles in streets and avenues within "the prescribed area" of the act of Congress regulating the use of telephone wires in the District of Columbia, approved June 30, 1902, has been increased during the year by 1, identical with the preceding year, notwithstanding. The regulated joint use of poles, in most situations, is favored and, on rare occasions, is imposed; the two most active companies have a working arrangement in that matter which generally brings about the best practical results.

ELECTRIC INSPECTION—WIRES AND APPARATUS.

In the operations under the act of Congress to regulate electrical wiring in the District of Columbia, approved April 26, 1904, and the regulations thereunder:

The total of permits issued for installation of wires and apparatus on private property was 8,029 compared with 6,217 in the preceding year.

Fees paid to the collector of taxes, $13,861, compared with $11,626.

Number of inspections recorded, 17,284, compared with 16,170.

These figures not only show increase above preceding year but the number of permits issued, for instance, has increased at the average rate per year for the past three years of 33⅓ per cent.

To save space, reference is made to report of 1920, in the matter of need of increased personnel for this service, and the statements and recommendations therein repeated with added emphasis. One only needs to recall and consider the Knickerbocker Theater and the Iroquois Theater disasters to appreciate the hazard of the situation. Practically all the pressure on the building inspection division is reflected on the electrical department; yet the wiring permits covered by building permits are only 30 per cent of the total.

MISCELLANEOUS WORK.

The service of this department in cooperation with the municipal architect or for other District departments or divisions, in consulting and counseling, in preparing plans and specifications for and in supervision of electrical work, has been relatively considerable; plans and specifications were prepared, are being prepared, and the introduction of electric work has been supervised where started, in municipal properties: 1 high school; 2 junior high schools; 7 grade schools; 2 special schools; 1 hospital; 1 police station, and 1 market.

PERSONNEL.

Generally earnest and faithful, and in many instances exceptional, service has been rendered by the personnel of the department and I recommend all to your sympathetic consideration.

Very respectfully,

WARREN B. HADLEY,
Electrical Engineer.

To the ASSISTANT TO ENGINEER COMMISSIONER.

Lamps of all kinds in service June 30, 1922, as compared with June 30, 1921.

Kind of lamp.	1921	1922	Kind of lamp.	1921	1922
Mantle gas, single burner	10,581	10,617	Electric incandescent—Con.:		
Mantle gas, double burner	.....	117	100-candlepower, multiple	98	98
Electric arc:			60-candlepower, series	3,917	4,021
6.6-ampere magnetite	282	283	60-candlepower, multiple	269	274
4-ampere magnetite	497	500	Street designation:		
Electric incandescent:			Gas	397	401
250-candlepower, series	14	89	Electric	179	184
200-candlepower, multiple	64	64			
100-candlepower, series	4,044	4,060	Total	20,342	20,708

Net increase during year, 366 lamps.

Fire alarms received and transmitted:	
Regular box alarms	984
Alarms received from telephone stations	6
Local alarms	1,007
Second alarms	18
Third alarms	9
Fourth alarms	5
Fifth alarms	4
Total	2,033
False alarms:	
Box	139
Local	42

Distribution of police patrol boxes, June 30, 1922.

Precinct.	Wall boxes.		Booths.	Total.
	Underground.	Overhead.		
First	37	1	.....	38
Second	28	.....	.....	28
Third	50	.....	.....	50
Fourth	37	2	.....	39
Fifth	44	2	.....	46
Sixth	29	.....	.....	29
Seventh	23	4	.....	27
Eighth	28	.....	.....	28
Ninth	38	23	1	62
Tenth	52	10	4	66
Eleventh	4	35	1	40
Subprecinct, Tennallytown	11	21	2	34
Total	[1] 381	98	8	487

[1] Thirteen of these boxes, at following locations, are not on posts: 3, Union Station; 1, engineer stables; 1, Takoma Park, watch box; 1, Treasury Department; 1, Agricultural Department; 1, Department of Justice; 1, Pan-American Union Building; 1, Walter Reed Hospital, information bureau; 3, in special booths erected by the police department at Fourteenth and Kennedy streets NW.; Twenty-second Street and Rhode Island Avenue NE.; and Connecticut Avenue and McKinley Street NW.

Telephones connected to the district system June 30, 1922.

Offices of the District building	205
Outside offices and institutions	108
Residences	4
Public schools	245
Fire department	58
Police department	65
Water department, private branch exchange	44
Franklin School, private branch exchange	39
Western High School, private branch exchange	18
McKinley Manual Training School, private branch exchange	18
James Ormond Wilson Normal School, private branch exchange	30
Miner Normal School, private branch exchange	13
New Central High School, private branch exchange	36
Dunbar High School, private branch exchange	22
Public Library, private branch exchange	22
Washington Asylum and Jail, private branch exchange	25
District repair shop, private branch exchange	6
House of detention, private branch exchange	8
Police patrol service	487
Total	1,453

There are also 27 portable telephone sets in service, the property of the District of Columbia, used by the fire department and electrical department.

Signals distribution system.

	Cables.	Conductor.	Cables.	Conductor.
Underground:	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Installed, 1922	2.365	69.361		
Withdrawn, 1922	0.066	1.705		
In service June 30, 1922			165.541	6,460.04
Aerial:				
Installed, 1922	1.137	18.197		
In service, June 30, 1922			5.84	174.81
Total			171.381	6,634.85

Electrical wiring inspections.

Notices received from the inspector of buildings of permits indicating electric wiring:	
Building	1,746
Machinery	239
Signs	62
Total	2,047
Permits issued by the electrical department for installation:	
Without fee (ordered by District of Columbia, etc.)	113
Covered by building permits	2,395
Not covered by building permits	5,412
For temporary work	71
Quarterly (maintenance of plants, etc.)	38
Total	8,029
Temporary use of current	437
Total	8,466
Certificates issued:	
Final (including 2 without fee)	5,212

	Number.	Approximate kilowatts.
amps and apparatus installed:		
Lamps, incandescent	135,541	6,777.00
Lamps, arc	7	24.75
Motors	427	1,533.00
Devices, miscellaneous	206	487.17
Blank outlets	169	.....
Subtotal	136,350	8,821.92
enerators	3	143.00
ransformers	9	825.00
Total	136,362	9,789.92

Defective wiring discovered and reported by inspectors, extra of routine inspection work	327
Number of notices of defective wiring sent	1,874
Requests for inspection (not related to work already under permit)	12
Miscellaneous jackets (specifications, etc., for District of Columbia work, etc)	224
Notices received from the superintendent of licenses, leading to original inspection or periodic (annual) reinspection of theaters, hotels, assembly halls, etc	192

Work of inspectors of electric wiring from July 1, 1921, to June 30, 1922:

Inspections in private buildings not including theaters and moving picture theaters	16,468
Inspections in municipal buildings	166
Inspections in United States Government buildings	10
Inspections in theaters (including moving picture theaters) including reinspections, periodic (annual) and occasional, of moving picture theaters (more frequent periodic inspections being made by the fire marshal) and periodic reinspections (weekly or more frequently if bill changes) of theaters	690
	17,284

Fees paid to the collector of taxes:
For permits $13,861

MISCELLANEOUS WORK.

Completed:
- Johnson School, lighting.
- Public produce market, shed "C," lighting.

Under construction:
- New Eastern High School, lighting, power, telephones, clock and bells, and laboratory equipment.
- Monroe School addition, lighting and power.
- Eaton School addition, lighting and power.
- Wheatley School addition, lighting and power.
- Buchanan School addition, lighting and power.
- Lincoln Park School, lighting and power.
- Psychopathic group, Gallinger Hospital, lighting fixtures.
- Industrial Home School, lighting, power, and heating.

Prepared but work not started:
- Health School, lighting and power.
- Bell School, lighting and power.
- Power plant, Gallinger Hospital, lighting.
- Cell corridors, No. 2 precinct police station, lighting.

n preparation:
- Two typical wards, Gallinger Hospital, lighting, power, telephone and nurses' call.
- Two junior high schools, lighting, power, telephones, clocks and bells.

BRANCH OF NEW YORK PUBLIC LIBRARY MUNICIPAL REFERENCE

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BRANCH OF NEW YORK PUBLIC LIBRARY MUNICIPAL BUILDING

REPORT OF THE WHARF COMMITTEE.

WASHINGTON, *August 30, 1922.*

SIR: The wharf committee has the honor to submit the following report for the fiscal year ended June 30, 1922:

A list of wharf property under lease on June 30, 1922, and of all wharves used for municipal purposes is on file in this office.

The leases of Joseph P. Stephenson, G. W. Forsberg, and the J. Maury Dove Co. expired during the year, but were not renewed. New leases were entered into with the Maryland, Delaware & Virginia Railroad Co. for the Stephenson Wharf and with James O. Holmes for the Forsberg Wharf. The wharf formerly occupied by the J. Maury Dove Co. is vacant.

It is the policy of the commissioners to fix wharf rentals upon the advice of the assessor as to the value of the property.

The total frontage of wharf property on the city side of the Washington Channel, Potomac River, is 9,275 linear feet, of which slightly over one-half is under Federal jurisdiction. The balance, that is, the frontage between the south curb line of N Street and Thirteenth Street west, is under the control of the Commissioners of the District of Columbia.

That part of the water front under the control of the commissioners is occupied by the municipal fish market and wharves, the morgue, the harbor police precinct, the fireboat wharf, and the workhouse and sand wharves, all of which are municipal activities, and also by lumber and cordwood dealers, marine railways, boathouses, and freight and excursion boat interests.

The waterfront along the Georgetown Channel is under private control, with the exception of the termini of streets, the terminus of Thirty-first Street being leased by the Cranford Paving Co.

Along the Anacostia River front the United States Navy Yard occupies the frontage on the city side from Second to Eleventh Streets. The sewage pumping station and yard occupies the frontage between First and Second Streets. The intake of the Capitol power plant is located at the foot of First Street. The only privately leased frontage is that between the building lines of Q Street SE., which is occupied by the Standard Oil Co.

In the last annual report of the wharf committee attention was called to the deplorable condition of the water front along the Washington Channel. During the past fiscal year very favorable progress was made in the elimination of unsightly sheds and buildings which have been such an eyesore from East Potomac Park. Fifteen structures in all were removed.

When the leases of Joseph P. Stephenson, G. W. Forsberg, and the J. Maury Dove Co. expired, steps were immediately taken to demolish all buildings on the sites. At the Stephenson Wharf all buildings except the warehouse were removed. This warehouse has since been repaired and painted. At the Forsberg Wharf the unsightly piles of scrap iron, boilers, old machinery, etc., were removed and all buildings demolished, while at the Dove Wharf the stable, storage building, office building, and other structures were demolished and the débris hauled away.

In addition to the above, several unsightly sheds which stood at Bennett's shipyard and which marred the appearance of the fish market from the street front, were torn down, as well as an office building formerly occupied by the Roberts Lumber Co.

The destruction of these unsightly buildings has improved to some degree the general appearance of the water front, and with the subsequent removal of other buildings as existing leases expire, it is believed that conditions will continue to improve.

Our grateful acknowledgments are due Mr. William J. Fay, superintendent of the District of Columbia Home for the Aged and Infirm, for supervising the work of removing these buildings. Handicapped as we were by lack of funds, it was possible, with Mr. Fay's assistance, to have the work performed by employees of that institution.

The commissioners adopted the suggestion of the wharf committee that Wharf No. 6, now in the course of construction, be turned over to the harbor precinct upon completion, so that the ramshackle buildings which now house that precinct, and which are a disgrace to the city, may be demolished.

The motor truck has displaced the river steamer to a great extent in the transportation of vegetables, fruits, and other commodities from the tidewater counties of Maryland and Virginia. At the present time there are three freight steamers in the river transportation business, but the steamboat companies report that they could handle more business if it were not for the motor truck.

The United States Engineer Office reports an increase of $1,000,000 in the value of materials shipped into Washington by water during the calendar year 1921.

While we can not predict what the future needs of commerce will be, it is believed that the present is the logical time to give consideration and study to the adoption of a plan for the general improvement of the entire water front of the Washington Channel, with a view to providing maximum facilities for all legitimate water front uses, both governmental and commercial. The first step in this direction should be the establishment of a bulkhead wall. The Board of Engineers of Rivers and Harbors has this matter under advisement.

When the District of Columbia was zoned in 1920, certain areas along the Georgetown Channel and along the Anacostia and Potomac Rivers were set aside for industrial and commercial purposes. The water front of the Washington Channel was not, however, zoned to permit industrial or commercial activities, the commissioners' idea relative thereto being to permit definitely only such business as existed prior to the adoption of zoning, and to decide future uses as the need arose. In this connection it is believed that the use of the water front along Water Street SW. should be more or less restricted because of East Potomac Park on the opposite side, and that no new enterprises should be encouraged which would tend to mar or detract from the appearance of Potomac Park.

A careful record of the dates on which fire insurance policies expire has been kept, and the necessary steps taken to have policies renewed upon expiration.

With the exception of two or three wharves, surveys were made by the surveyor, at the request of the wharf committee, of all wharf property on the water front along the Washington Channel under municipal control.

ROLAND M. BRENNAN,
Chairman.
D. E. MCCOMB,
RUSSELL DEAN,
Wharf Committee, District of Columbia.

To the ENGINEER COMMISSIONER.

REPORT OF THE BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS.

WASHINGTON, *September 15, 1922.*

GENTLEMEN: We have the honor to submit the following report for the year ended June 30, 1922. Buildings on which action was taken in response to notices served under the act creating the Board for the Condemnation of Insanitary Buildings during the year ended June 30, 1922.

REPORT FOR YEAR ENDED JUNE 30, 1922.

	Examined.	Demolished.	Repaired.	No action warranted.	Value of repairs.	Pending.
Buildings in streets	248	62	74	98	$43,430	14
Buildings in alleys	86	22	24	34	3,000	6
Buildings condemned under sec. 16, Building Code:						
Buildings in streets	44	28	14	.....	.....	2
Buildings in alleys	25	20	5	.....	.....	0
Total	403	132	117	132	46,430	22

SINCE BOARD WAS CREATED.

Buildings in streets	3,905	1,779	1,356	578	$185,265	.....
Buildings in alleys	4,516	898	673	2,861	29,355	.....
Total	8,421	2,677	2,029	3,439	214,620	.....

Number of board meetings held during the year ended June 30, 1922	18
Number of preliminary notices served during the year ended June 30, 1922	134
Number of condemnation notices served during the year ended June 30, 1922	40
Number of condemnation cards affixed to buildings during the year ended June 30, 1922	49
Number of condemnation notices served under section 16 of the Building Code during the year ended June 30, 1922	69
Inspection and miscellaneous visits	1,459
Estimated number of people required to secure other living quarters	528
Number of cases in court	1
Estimated number of tenants and occupants of dilapidated and insanitary buildings benefited by repairs during the year ended June 30, 1922	585
Estimated number of tenants and occupants of insanitary and dilapidated buildings benefited by repairs since the creation of the board	7,421

The alley housing situation is improving each year owing to the elimination of the alley dwellings by the removal of the old, dilapidated, and insanitary frame dwellings and the conversion of brick dwellings into garages and warehouses. There were 117 alley dwellings repaired and converted from living quarters to garages and warehouses during the year ended June 30, 1922, by action of the board, and the use of many more alley dwellings was changed during the year through permits issued by the inspector of buildings.

The act of Congress approved September 25, 1914, declaring the use or occupation of any building or other structure erected or placed on or along any alley as a dwelling or residence or place of abode by any person or persons is injurious to life, to public health, morals, safety, and welfare of the District of Columbia; and such use or occupation of any such building or other structure on, from, and after the 1st day of July, 1918, shall be unlawful, was amended by an act of Congress

approved May 23, 1918, which amendment provides: "That the operation of the second paragraph of section 1 (relating to the use or occupation of alley buildings as dwellings) * * * in the same hereby is postponed until the expiration of one year following the date of the proclamation by the President of the exchange of the ratifications of the treaty of peace between the United States and the Imperial German Government. * * *"

That the operation of the second paragraph of section 1, relating to the use or occupation of alley buildings as dwellings, of the act of Congress approved September 25, 1914, entitled "An act to provide, in the interest of public health, comfort, morals, and safety, for the discontinuance of the use as dwellings of buildings situated in the alleys in the District of Columbia," be, and the same hereby is, postponed until June 1, 1923.

Passed the Senate August 24, 1922.

CAREY H. BROWN,
Major, Corps of Engineers, U. S. Army,
Assistant to Engineer Commissioner, District of Columbia.
W. C. FOWLER, M. D.,
Health Officer, District of Columbia.
JOHN P. HEALY,
Inspector of Buildings, District of Columbia,
Board for the Condemnation of Insanitary Buildings,
District of Columbia.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF THE SUPERINTENDENT OF THE DISTRICT BUILDING.

WASHINGTON, D. C., *August 17, 1922.*

SIR: I herewith submit my report on the care of the District Building, including the operation of the power plant, woodwork and paint shops, print and blue-print shops, elevator, watch, and cleaning forces, and the electrical department, for the fiscal year ended June 30, 1922.

There have been numerous changes during the year; congested conditions in many departments necessitated the interchanging of several offices, including those of Commissioner Rudolph, Major Besson, the sewer department, board of children's guardians, public utilities and trees and parkings; these changes made necessary the building of partitions, repainting of walls, refinishing of floors, etc. The exterior sills and frames of all window openings were repainted.

Eight thousand dollars were expended for repairs to the roof of the District Building. Price quoted by several contractors was approximately $30,000; with only $8,000 available it was necessary that we make the repairs instead of having the work done by contract.

The tile and the cement in which they were laid were taken up from about two-thirds of the roof; the tarred paper was thoroughly cleaned, and where necessary was patched by mopping new paper over the old, this surface was then covered with plastic cement, the base of which is asphalt, not pitch, the tile was then relaid in this. Joints were washed with Portland cement, and expansion joints placed each 30 feet. The appropriation being insufficient for relay-

BLUE-PRINT AND PHOTOGRAPH SHOP.

The building of the Eastern High School and additions to many other schools and buildings increased the work of this department considerably. In spite of the fact that our price for blue printing was this year reduced from 4 to 3 cents per square foot, there was an increase of $4,785.15 as compared with receipts of last year.

A drier for the Pease blue-printing machine was purchased at a cost of $600, thereby greatly facilitating the work of this department. There were completed 183,608 square feet of blue printing and 2,550 photographs, lantern slides, maps, etc., at a total cost of $8,103.22.

I again call attention to the necessity of either building an addition to the District Building or acquiring additional property for the housing of some of the departments. Since the erection of the building, 14 years ago, all floor space has been utilized for the relief of congestion caused by newly created departments and the growth of the original ones. Rooms have been constructed in corridors and under stairways; partitions have been built in offices; and at least two departments are dividing their working forces into a. m. and p. m. shifts because of insufficient floor space for the conduct of their business.

F. S. BESSON,
Major, Corps of Engineers, United States Army,
Superintendent.

The COMMISSIONERS OF THE DISTRICT OF COLUMBIA
(Through the Engineer Commissioner).

Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED

JUNE 30

1923

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UNDER THE DIRECTION OF

COL. CHARLES KELLER
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia
July 1, 1922, to June 24, 1923

AND

MAJOR J. F. BELL
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia
June 25, 1923, to June 30, 1923

WASHINGTON
GOVERNMENT PRINTING OFFICE
1923

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ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT COLUMBIA.

Maj. J. F. Bell, *Corps of Engineers, United States Army, Engineer Commissioner.*
Maj. R. A. Wheeler, *Corps of Engineers, United States Army, Assistant.*
Maj. W. H. Holcombe, *Corps of Engineers, United States Army, Assistant.*
Capt. John E. Wood, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONE

Zoning Commission:
Maj. R. A. Wheeler, *Executive Officer.*
Street and Alley Cleaning, Collection of Garbage, etc.:
Morris Hacker, *Supervisor.*
T. L. Costigan, *Superintendent of Street Cleaning.*
Record Division:
Roland M. Brennan, *Chief Clerk.*
Wharf Committee:
Roland M. Brennan, *Chairman.*
D. E. McComb, *Engineer of Bridges.*
Russel Dean, *Harbor Master.*
Contract Board:
Roland M. Brennan, *Chairman.*
District Building:
Capt. John E. Wood, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR WHEELER.

Highways (Streets, Roads, Bridges, etc.):
C. B. Hunt, *Engineer of Highways.*
J. W. Dare, *Assistant Engineer of Highways.*
Sidewalks and alleys—
H. N. Moss, *Superintendent of Streets.*
Construction and maintenance of suburban roads—
L. R. Grabill, *Superintendent of Suburban Roads.*
Construction and care of bridges—
D. E. McComb, *Engineer of Bridges.*
Engineer Department stables—
Bart J. Lynch, *Superintendent.*
Asphalts and Cements:
J. O. Hargrove, *Inspector of Asphalt and Cement.*
Trees and Parkings:
Clifford Lanham, *Superintendent of Trees and Parkings.*
Surveyor's Office (Including Street Extensions):
M. C. Hazen, *Surveyor.*
Building Inspection:
John P. Healy, *Inspector of Buildings.*
Plumbing plans and inspection—
A. R. McGonegal, *Inspector of Plumbing.*
Permits, Engineer Department—
H. M. Woodward, *Permit Clerk.*
Plumbing board—
Louis Conradis.
James S. O'Hagan.
Samuel Tapp.
Board of examiners of steam engineers—
E. F. Vermillion.
H. Boesch.
W. I. Evans.
Board for Condemnation of Insanitary Buildings:
Maj. R. A. Wheeler, *Assistant to the Engineer Commissioner.*
Dr. W. C. Fowler, *Health Officer.*
John P. Healy, *Inspector of Buildings.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR HOLCOMBE.

Purchase of Land.
Motor Transport.
Property Maintenance and Utilization.
Automobile Board.

UNDER THE IMMEDIATE SUPERVISION OF CAPTAIN WOOD.

Water Department:
J. S. Garland, *Superintendent.*
Water rates—
G. W. Wallace, *Water Registrar.*
Sewer Construction and Maintenance:
J. B. Gordon, *Sanitary Engineer.*
Electrical Department:
Warren B. Hadley, *Electrical Engineer.*
Municipal Architect:
Albert L. Harris.
Repairs to Municipal Buildings—
Henry Storey, *Superintendent of Repairs.*
Municipal Garage:
E. P. Brooke, *in charge.*
Charles N. Emmons, *Superintendent.*
Board on Oils and Lubricants:
Capt. John E. Wood, *Chairman.*

T FROM REPORT OF THE COMMISSIONERS OF ISTRICT OF COLUMBIA FOR THE FISCAL YEAR) JUNE 30, 1923.

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, December 3, 1923.

nate and House of Representatives of the United States of in Congress assembled:

mmissioners of the District of Columbia herewith submit formation of Congress, pursuant to the requirements of sec- an act providing a permanent form of government for the f Columbia, approved June 11, 1878 (20 U. S. Stats. 108), f the official doings of that government for the fiscal year e 30, 1923.

* * * * * *

ROADWAY PAVEMENTS.

ompanying table shows the area in square yards of new pavements laid and old roadway pavements resurfaced e year, with the totals in square yards and miles of the nds of pavements at the close of the fiscal year.

e statement showing character and extent of roadway pavements.

	Existing amount on June 30, 1922.		New pavement laid during year, square yards.	Pavements replaced during year, square yards.	Existing amount on June 30, 1923.	
	Square yards.	Miles.			Square yards.	Miles.
d coal tar	3,422,397	182.21	21,079	.....	3,443,476	183.36
.....	612,205	31.11	.....	.....	612,205	31.11
e	.....	.....	44,996	.....	44,996	3.12
.....	17,968	.57	.....	.....	17,968	.57
uminous concrete:						
base	78,708	4.58	.....	.....	78,708	4.58
se	51,088	2.68	.....	[3] 4,882	46,206	2.47
)	261,705	14.07	42,506	.....	304,211	16.35
d rubble	357,190	19.54	.....	[1] 688 [2] 21,897	334,605	18.35
.....	17,390	1.04	.....	.....	17,390	1.04
.....	36,374	1.52	.....	.....	36,374	1.52
ated)	1,874,310	120.58	.....	[1] 9,461 [2] 23,099 [3] 5,524	1,836,226	117.76
proved (traveled)	.....	149.34	.....	.....	.....	156.51
alt streets	241,364	.....	1,553	.....	242,917	.....
tained by street railways	564,525	.....	3,509	.....	568,034	.....
ltic concrete streets	11,201	.....	.....	[3] 611	10,590	.....
.....	7,546,425	527.24	113,643	66,162	7,593,906	536.74

[1] Sheet asphalt. [2] Asphaltic surface. [3] Cement concrete.

The sums appropriated for expenditures during the year under this head were as follows:

For repairing old roadway pavements, including asphalt resurfacing	$460,000
For paving new roadways	233,500
For repair of suburban roads	250,000
For grading streets, alleys, and roads	35,000

The prices paid under contracts for roadway pavements during the year were as follows:

Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 6-inch concrete base:	
Class A—Natural pitch lake asphalt	$3.21
Class B—A reduced oil asphalt	3.11
Laying vitrified block with 6-inch concrete base	3.21
Laying 6-inch concrete roadway	1.87

Unit costs of contract work showed no recession, except as to concrete roadways. Funds for paving roadways were quite inadequately provided and this fact, with the continued development of new streets by builders, created a situation little short of deplorable.

A fund of $50,000 provided this year for the paving of roadways on deposit by the property owners of one-half the cost was entirely consumed. At the end of the year all work appropriated for had been completed, except two small items which were approaching completion under contract.

A special asphalt-surface mixture, designed by Major Besson, was laid somewhat experimentally on certain granite-block roadways and certain fairly heavily traveled suburban macadam roadways as a part of the year's work.

SUBURBAN STREETS AND ROADS.

The work of repairs to suburban roads consisted almost entirely of maintenance of the suburban road and street system and of roadways on unimproved streets where buildings had recently been erected. Repairs to the macadam roads were made principally by patching with bituminous materials and stone. Bituminous surface treatment was given to about 652,000 square yards of macadam roads at an average cost of about 6 cents per square yard. In this treatment there were used 83,179 gallons of road oil, 72,860 gallons of tar, and 8,000 tons of gravel and stone chips. Previous recommendations for paving the principal trunk highways to the District line as rapidly as funds can be provided and for legislation limiting the weights of loaded vehicles are renewed.

MUNICIPAL ASPHALT PLANT.

The District of Columbia has operated a portable municipal asphalt plant in the repair of asphalt pavements and bituminous macadam roadways for the past 12 years. During the year 1923 the plant was operated for a period of 247 days, with a total output of 211,500 cubic feet of material, or an average daily output of 856 cubic feet. Additional asphalt material for street repairs supplemental to that furnished by the asphalt plant was purchased under contract from the Cranford Co. to the amount of 6,103.20 cubic feet.

The details of the cost of the operation of the plant are contained in the report of the engineer of highways.

SIDEWALKS AND ALLEYS.

The sum of $250,000 was appropriated for paving sidewalks and alleys in all parts of the District and the sum of $15,000 for laying sidewalks and setting curbs around Government buildings, reservations, and parks. Sidewalks are paved with cement concrete under contract, while alleys are paved with cement concrete by day labor forces.

One-half of the cost of curb, sidewalk, and alley pavement is assessed against the abutting property, except that abutting public buildings and public reservations. The contract for laying sidewalks during the year was as follows:

For large jobs adjoining paved streets, per square yard, exclusive of grading	$1.63
For large jobs adjoining unpaved streets and for small jobs, per square yard, exclusive of grading	1.80

BRIDGES.

The expenditures from the appropriation for the construction and repair of bridges amounted to $24,890.97, and there is an obligation of about $2,300 on contract 7737 for reconstruction of Kenilworth Avenue culvert.

The appropriation for Anacostia and Highway Bridges were expended practically in full.

Contract with the Allen H. Rogers Co. for construction of nine reinforced concrete stalls at the District stone trestle completed at a cost of $11,579.57.

Contract with Royal J. Mansfield for construction of 12 reinforced concrete bins at the District stone trestle completed at a cost of $15,062.60.

Contract with Royal J. Mansfield for repairs to Calvert Street Bridge over Rock Creek completed at a cost of $20,221.09.

Contract with the Cambridge Manufacturing Co. for construction of reinforced concrete wharf deck at Wharf No. 6 completed at a cost of $14,665.69.

Contract entered into with the Pamfilis Constructing Co. for painting three spans of the Anacostia River Bridge. Work is in progress.

Contract entered into with the William F. Cush Co. for reconstruction of culvert in line of Kenilworth Avenue NE., north of Benning Viaduct. Work is in progress.

INSPECTION OF ASPHALTS AND CEMENTS.

Through this office, tests, chemical and physical, are made of materials used in street and road improvements, likewise all cements used in buildings and in sewer construction, fuel oils used at the municipal asphalt plant, and miscellaneous tests of any materials requiring such. Complete tests made during the year were: Asphalt materials, 881; oils, 16; pitch, 3; tars, 3; sand, 90; gravel, 70; stone, 35; limestone dust, 21; cements, 8,946, representing 89,468 barrels; miscellaneous materials, 2,951; total, 13,016.

The samples of asphalts tested represent 2,008 tons, 1,270 tons used by contractors for laying roadways and 738 tons used at municipal asphalt plant in producing paving materials.

Of the materials tested there were rejected 2,155 cubic yards of sand and 1,600 cubic yards of gravel.

SURVEYOR'S OFFICE.

The work of this office is divided into three classes:

1. Work done for private parties for which a fee is charged, the amount charged being regulated by schedule of fees approved by the commissioners.

2. Work done for the various coordinate departments of the District of Columbia and for the Federal Government, no fee being charged for this class of work.

3. Surveys, descriptions, and preparation and report covering all condemnation cases for streets, alleys, and parks.

The first class of work, or private work, for which a fee is charged, has greatly increased over any previous year. This increase has been continuous since the close of the war, and has grown to such proportions that the present office force can not perform the work promptly for the public.

The number of lots, or parts of lots, surveyed during the past year was 6,065, while those of the previous year numbered 5,043; surveys to verify walls under construction for the past year 1,893, previous year 1,700; number of lots inspected where new buildings are being erected for the past year 3,305, previous year 3,022; number of lots created by subdivision during past year 4,632, previous year 3,878; estimates or orders for work to be done past year 12,659, previous year 11,320; number of plats prepared for private parties during past year 10,308, previous year 8,658; total number of surveys during past year 5,122, previous year 4,135; total number of plats drawn the past year 14,669, previous year 12,100.

This shows an increase in all classes of work in this office for the fiscal year ended June 30, 1923, over the year ended June 30, 1922.

The total receipts for the past fiscal year ended June 30, 1923, amounted to $48,461.90, against $40,503.80 for the previous fiscal year ended June 30, 1922. The amount collected during the past year is in excess of the appropriation for the maintenance of the office, although it has never been assumed that this office should be self-sustaining.

HIGHWAY PLAN.

The appropriation of $2,000 for marking permanently on the ground the permanent system of highways has been expended in running out street lines and marking block corners by permanent monuments. About 125 granite monuments have been placed at different parts of the District to mark the street plan, some of the important streets marked being Alabama Avenue, Benning Road, Forty-sixth Street, Division Avenue, Sheriff Road, and South Capitol Street.

This appropriation has been advantageously expended and should be continued.

Changes in the highway plan can be made after plans providing for such changes are drawn up by the commissioners and approved by the highway commission composed of the Secretary of War, the Secretary of the Interior, and the Chief of Engineers, United States

Army, with certain other legal requirements to be carried out by the commissioners of the District.

Several such changes have been made during the past year and are now of record in the surveyor's office, as follows: (1) Seventeenth Street between Blagden Avenue and Colorado Avenue NW., (2) Crittenden Street between Sixteenth Street and Seventeenth Street NW., (3) Alabama Avenue between Thirty-first Street and Pennsylvania Avenue SE.; Austin Street, east of Thirty-second Street SE.; Suitland Road south of Bowen Road, SE.; and (4) Alabama Avenue (Hamilton Road) between Twenty-second Street and Twenty-fourth Street SE.

SUBDIVISIONS.

The great building activity going on throughout the District has been the cause of the greatly increased number of subdivisions recorded in the surveyor's office. During the year the subdivision regulations were revised, approved by the commissioners and published in pamphlet form.

The number of subdivisions prepared during the past fiscal year was 537, this being an increase of 55 over the previous year. The number of subdivisions recorded was 496, an increase of 26 over the previous fiscal year.

CONDEMNATION CASES.

During the past fiscal year there were before the courts 42 street and park condemnation cases and 17 alley cases; 23 new condemnation street and park cases were filed in court, and 12 new alley cases; 13 street and park cases and 9 alley cases were confirmed by the court. The magnitude of this class of work will be shown by the fact that the total amount of damages allowed for the property taken for streets, parks, etc., was $130,730.39, and the amount allowed for alleys $14,979.64.

The following were some of the important condemnation cases considered during the past fiscal year: Establishment of building restriction lines on Kalorama Road, Wyoming Avenue, Thirteenth and Fourteenth Streets, and the opening of Legation Street, Eastern Avenue, Fifteenth Street, Hamlin Street, Southern Avenue, Jenifer Street, Forty-second Street, Fourteenth Street, streets in Barry farm (east of Nichols Avenue), Ninth Street, Underwood Street, Tuckerman Street, and many others.

Some criticism has been made to opening streets by condemnation in which the entire cost is assessed as benefits because of the necessary delay in making streets physically usable, but it is believed the law has been a great benefit in developing the District in an orderly, comprehensive way.

The erection of improvements has prevented the opening of many important streets, as the assessment for benefits in such cases is so great the property owners could not equitably stand the assessments. In such cases there should be an appropriation to bear part of the cost. Many localities have been retarded in development by reason of streets being thus blocked, and the sooner some provision is made for opening these streets the better it will be for the development of the street plan and the orderly growth of the city.

PARKS.

The L'Enfant plan of the Federal city of 1791 provided for a magnificent street and park plan. This plan stopped at Boundary Street (now Florida Avenue), beyond which there is no park plan, and if provision is not made for the acquisition of land for parks over this area there will be a great lack of parks through the outlying sections. There are many beauty spots where magnificent trees exist which should be acquired before the rapid development of the city destroys them.

The surveyor's office has from time to time recommended specific tracts for parks, where there is danger of their being lost for park purposes. These are Piney Branch Parkway, east of Sixteenth Street, Klingle Road Valley, and Patterson tract. Attention is especially called to rapid encroachment up Piney Branch and Klingle Road Valley. These sites have already been reduced in area, and it is believed that Piney Branch Parkway will be lost if not acquired within the next year.

Klingle Ford Valley should be made the link connecting Potomac Park on the south with Rock Creek Park on the north. This would eliminate the necessity of traffic passing through Zoological Park, which is a playground for children, where traffic should be restricted.

CIVIL WAR FORTS.

Steps should be taken to preserve the 40 or more fort sites and batteries constructed for the defense of Washington during the Civil War. Some of these sites have already been destroyed by progress of improvements, but some are still well preserved. All are of great historic interest. Beautiful boulevards on high ground overlooking the city should be constructed connecting these sites.

SMALL PARKS.

Many small park areas have been acquired under the appropriation for this purpose. This appropriation has been reduced from time to time from $25,000 to $5,000 for the current fiscal year. The acquisition of these small areas frequently prevents the construction of some cheap and unsightly improvements, and is a matter of great importance, and the appropriation should be increased and continued.

There were 24 small park cases before the courts for condemnation during the past year, some of which have been confirmed.

STREET PARKING.

Some study should be given to the question of a uniform treatment for parking space within the street lines of the residential districts.

A specific case in this connection is the parking along Sixteenth Street. The title to this land is in the Federal Government, under the jurisdiction and control of the commissioners. The property owner has the benefit of the parking area in his front yard, for which he pays no rent or taxes. It is thought that this area should be beautified and the appearance of the residential streets much im-

proved. At present all kinds of treatment of these parking areas can be seen. Some are on terraces and some without terraces, and some have fences and hedges and others are without them. It is believed that each block should be similarly treated and the appearance of the city thereby much improved.

To accomplish this result legislation would probably be necessary and an initial appropriation needed, after which it might be reimbursed by assessment against the abutting property owners similar to the establishment and maintenance of sidewalks.

TREES AND PARKING.

The number of trees along the curbs on the streets of the District of Columbia at the close of the fiscal year was 104,593. Only 58 trees were planted in their permanent positions on the streets during the year, as the planting of trees on the streets had to be abandoned, due to the loss of two tracts of ground which had been used as tree nurseries for a number of years.

The nursery at Fort Dupont is still being used for the propagation of trees for street planting. Two hundred and eighty-seven elm, 17 Norway maple, 62 red maple, and 105 sugar maple seedlings were planted in the nursery rows at the Fort Dupont site.

In September, 1922, the Chief of Engineers, United States Army, granted permission to the Commissioners of the District of Columbia to use a tract of the reclaimed ground along the Anacostia River, immediately upstream from Bolling Field. Twelve hundred elm, 173 pin oak, and 700 red oak seedlings were set out in the nursery rows at the last-named tract of ground.

The systematic trimming of trees was resumed during the year, and commencing at Eighteenth Street NW. as the eastern limit, with B Street and Florida Avenue as the south and north boundaries, the work was continued westward to and including all streets in Georgetown. In addition to the systematic trimming a small force of men accomplished much trimming upon individual requests. There was a noticeable increase in the number of requests received from individuals for trimming trees throughout the city. The total number of trees trimmed during the year was 12,667.

The sum of $4,793.11 was expended during the year to remove weeds from uninclosed public parkings along the streets of the city. One thousand, three hundred and fifty-five permits were issued to regulate the grade of the parking in connection with building operations.

The purchase of ground for a permanent tree nursery would be a most desirable step in point of economy, after consideration of the fact that two nurseries have recently been abandoned, and that there is no assurance as to the length of time we can occupy the ground we are now using to propagate trees for planting along the thoroughfares of this city. The rapid growth of the city makes it almost imperative that consideration be given toward legislation in order to obtain an appropriation to purchase a permanent nursery site.

COLLECTION AND DISPOSAL OF CITY REFUSE AND STREET AND ALLEY CLEANING.

The outstanding and interesting feature of the work done by the city refuse division was the amount of money returned into the Treasury from products sold. There was received from garbage grease and tankage and from salvaged material a total of $356,172.40.

This exceeded anything done in previous years. This revenue is accounted for by the large amount of garbage handled and by the good prices received for grease and baled paper.

The appropriation for the collection and disposal of city refuse was $800,000, so that the return was 44½ per cent of this sum, or the actual expense of collecting and disposing of all city refuse (other than street-cleaning material) was slightly less than $444,000.

The collection and disposal of 145,432 cubic yards of ashes was a total loss with no salvage, except in so far as certain streets and alleys were improved by the deposited ashes in them, and cost $117,727.67. The amount paid to contractors for the collection and disposal of night soil and of dead animals was $20,860. Salaries not allocated to any particular service were $8,940. So that the expense of the collection and disposal of garbage and trash was $641,449.81.

The appropriation for dust prevention, cleaning of streets and alleys, was $375,000.

During the winter there were three light snows, which gave the department the opportunity to try out the snow law enacted by Congress at the previous session. When the sidewalks were not cleaned by the occupant of the abutting property, the work was done by the District. The expenditure by the city refuse division from the appropriation of $10,000 under this act was $6,832.08.

BUILDING OPERATIONS.

The estimated value of building construction, including repairs, during the year was $57,638,638, an increase of $21,441,579, as compared with the fiscal year 1922.

The number of permits issued was 12,191, an increase of 1,890 over the previous year. This is the greatest number of permits ever issued for any fiscal year by the building division. The total number of business buildings erected was 937, a decrease of 116. There were 3,478 new buildings, a decrease of 32. The number of apartments erected was 81, an increase of 21; 2,460 dwellings, an increase of 63. There were 5,938 permits granted to repair, an increase of 615.

During the past year there were issued 2,585 conforming certificates of occupancy and 118 nonconforming certificates, the fees therefor totaling $3,523.50, as compared with $3,305.50 for the year 1922.

Attention is invited to the fact that the receipts of this bureau for the fiscal year were $70,403.48; the salaries amounted to $54,998.98, a difference of $15,404.50. This increase of receipts above expenses indicates to a marked degree the additional labor imposed upon the employees, and should dictate, it is believed, a corresponding increase in salaries.

CONSTRUCTION OF MUNICIPAL BUILDINGS.

During the year 18 buildings were under construction as follows: A 4-room addition to the Monroe School, which was completed August 12, 1922; a 4-room addition to the Deanwood School, completed August 15, 1922; a 12-room addition to the Wheatley School, completed October 28, 1922; an 8-room addition to the John Eaton School, completed October 28, 1922; an 8-room addition to the Lucretia Mott School, completed August 12, 1922; an 8-room building known as the Richard Kingman School, completed October 2, 1922; an 8-room addition to the Buchanan School, completed October 28, 1922; an 8-room building to replace the Bell School, completed March 3, 1923; the construction of the superstructure of the new Eastern High School, which was completed December 9, 1922; the Smothers School, which will probably be completed about September 22, 1923; the addition to the Lovejoy School, which will probably be completed about October 16, 1923; the Garrison School addition, which will probably be completed about November 30, 1923; the George Bancroft School, which will probably be completed about January 11, 1924; the Langley Junior High School, which will be completed about November 1, 1923; the Macfarland Junior High School, which will probably be completed about November 1, 1923; the Chain Bridge Road School, which will probably be completed about October 12, 1923; the construction of a head house on Wharf No. 6, and the erection of new police station No. 12.

Preliminary studies for the home for the feeble-minded have been made and a general program mapped out.

Besides the preparation of plans and specifications for the above buildings, plans and specifications for about 40 other pieces of work, such as heating systems in engine houses, cells, and other work in police stations, repairs to heating systems in school buildings, etc., were prepared in this office, amounting to $63,458. The contracts entered into by this office for the fiscal year amounted to a total of $1,498,377.

REPAIRS TO MUNICIPAL BUILDINGS.

All municipal buildings are kept in repair under the direction of the municipal architect. During the year only such repairs were made as would prevent further deterioration of the structures, as the continuation of high wages and high prices of materials prevented the doing of more extensive repair work with the funds that were available.

The appropriations for repair work and the expenditures of same were as follows:

For the repairs to school buildings: $250,000 was appropriated, and all was expended but $221.90.

For repairs to engine houses: $20,000 was appropriated, and all was expended but $16.74.

Repairs to stations: $7,000 was appropriated, and all was expended but $4.30.

Repairs to police court building: $2,000 was appropriated, and all was expended but $14.20.

In addition to the above, repairs were made on various buildings under the supervision of the superintendent of repairs to the amount of $114,655.55 out of appropriations controlled by other departments.

Steam boilers in 100 District buildings were inspected and repaired.

WORKHOUSE AND REFORMATORY.

The work at the workhouse and reformatory during the past year has been quite satisfactory. Five shops, two washhouses, two disciplinary wards, and one dormitory building have been completed and the foundations of two additional wards started. Plans are being made for the domestic building.

Considerable progress has been made on the industrial railroad at Lorton; the grading is practically completed, and nearly a half mile of track has been laid.

THE DISTRICT BUILDING.

The District Building was cared for by the various units of this department. There were consumed 2,017 tons of coal, which averaged 13.8 per cent ash. There were removed 537 cubic yards of ashes, at a cost of $267.61. Repairs made in the power plant included rebuilding two smoke-consuming arches and rebuilding No. 2 stoker. There were purchased two Sangamo watt meters, one new turbine head, and two sets of pins and cutters for boring boiler tubes. Electric current generated amounted to 485,740 kilowatt hours. The electrical department renewed the drum counterweight cables on six passenger elevators and made the usual repairs and installations. The print shop completed work amounting to $7,547.51, and the photograph and blue-print shop $2,891.30. The woodwork and paint shop repainted the walls and ceilings of 27 rooms, in addition to the refinishing of floors and general repairs. It is again recommended that additional floor space be acquired to relieve the congestion in the offices.

MUNICIPAL GARAGE.

For the fiscal year ended June 30, 1923, the municipal garage maintained and kept in running condition 44 automobiles. A laboring mechanical force of eight men made the necessary repairs and operated automobiles for departments having no drivers. The garage was kept open night and day, all machines being washed and supplied with oil and gasoline by the night force, who also served as watchmen.

The electric light wiring of the garage was uncovered and found defective, and it was deemed necessary to rewire the entire garage.

The total operating expense for the maintenance of the 44 automobiles, including gasoline, oil, tires, labor, and miscellaneous supplies, amounted to $18,038.64, or an average of $409.96 for each car, or $0.0731 per mile. The average mileage per car was 5,602.3 miles.

PLUMBING AND PLUMBING INSPECTION.

During the year the plumbing division made 42,467 regular inspections in the field, as compared with 38,105 the preceding year. The increase in the number of inspections was due in part to the increase in building construction during the year and in part to the increase in the number of complaints received by this office of insanitary plumbing in old houses or defective downspouts and gutters. The average number of inspections per day per man was 15, and the greatest number in any one day was 35.

It is estimated that the total cost of new plumbing work installed in private buildings was $3,397,074, and of repairs and remodeling work $2,072,772. No record was kept of the large amount of plumbing work done under the officers in charge of such work in the general Government buildings.

There were nine cases prosecuted in police court, and a total of $95 was collected in fines.

Of the 151 cases prosecuted under the drainage and nuisance acts for failure to connect with sewer or make necessary repairs, in 27 cases the work was done by the District and the cost thereof assessed against the property. There are 10 cases still pending under notice, and the balance were disposed of through the owner or agent doing the work or otherwise.

PLUMBING BOARD.

There were 24 sessions of the board for examining candidates for licensing as master plumbers and gasfitters. The total number of candidates examined was 72; the number of original candidates examined for licenses was 15, of whom 3 passed; and of the 57 who had been previously examined for licensing, 15 passed and 42 failed.

PUBLIC-CONVENIENCE STATIONS.

There were four stations in operation throughout the year, open from 6 a. m. until midnight, with two shifts of attendants, each working nine hours per day. The total patronage of the stations was about 12,500,000. The cash receipts for the year amounted to $8,441.12, and consisted of 5-cent fees received for use of pay toilets, rental of clean towels, and commissions received on telephone service, bootblack stands, etc.

INSPECTION OF STEAM BOILERS.

The number of steam boilers inspected by the inspector of steam boilers during the year was 460, including 35 belonging to the District of Columbia. Six boilers were condemned as unfit for further use. The compensation of the inspector of steam boilers is paid from fees collected from private owners of boilers. The total amount of fees reported by that official was $2,300, and the expense of inspection $325, leaving a net compensation of $1,975.

EXAMINATION OF STEAM ENGINEERS.

The board of examiners of steam engineers held 52 meetings and examined 262 applicants, of whom 143 were found competent and 119 incompetent.

STREET LIGHTING.

There are 21,256 public lamps of all kinds in the avenues, streets, alleys, etc., under the jurisdiction of the Commissioners of the District of Columbia, as follows:

Gas, mantle:		
Single burner	10,759	
Double burner	152	
		10,911
Electric, arc:		
6.6-ampere magnetite	283	
4.0-ampere magnetite	504	
		787
Electric, incandescent:		
600-candlepower, series	51	
400-candlepower, series	2	
250-candlepower, series	168	
200-candlepower, multiple	64	
100-candlepower, series	4,087	
100-candlepower, multiple	98	
60-candlepower, series	4,179	
60-candlepower, multiple	293	
		8,942
Street designation:		
Gas	405	
Electric	211	
		616
Total		21,256

There was a net increase during the year of 548 lamps.

The increase in aggregate candlepower of the street lighting system under the jurisdiction of the commissioners is from approximately 1,752,100 to approximately 1,848,300, less than 5.5 per cent; but 62 lamps, aggregating 32,300 candlepower, accrued by transfer of juisdiction, leaving the actual increase less than 3.7 per cent.

Four 4-ampere magnetite arc lamps were added, including two at north approach to Francis Scott Key Bridge; 37 incandescent lamps replaced gas lamps on East Capitol Street at and near new Eastern High School; 39 incandescents replaced gas in Fifteenth and Seventeenth Streets, K Street to Massachusetts Avenue, to effect relief of traffic situation in Sixteenth Street; small temporary installations were made on improved posts for observation, experimental, and test purposes; the remainder of the additions were in lots of six or less, widely scattered, to partly meet the demand in newly built-up suburban sections.

The street lighting, as a whole, is distinctly inadequate, and a comprehensive material improvement should be inaugurated at once.

The situation with respect to the several suits at law against certain railway companies for recovery of sums expended in maintaining lights adjacent to their respective rights of way remains essentially as stated in 1920 and succeeding reports.

SIGNAL SYSTEMS—FIRE ALARM TELEGRAPH, POLICE PATROL SIGNAL AND TELEPHONE SERVICE.

There were 782 fire-alarm boxes in service at the end of the year, 663 on underground and 119 on overhead wires, a net increase of 43 over the preceding year; 1,266 box fire alarms and 1,560 local alarms

were received and transmitted during the year, of which 156 box and 54 local were false. The number of box circuits in commission has been increased by 5, to 35, and redistribution made, relieving the more seriously overloaded.

There were 490 police-patrol boxes in service at the end of the year, 385 on underground and 105 on overhead wires, an increase of 3 over the preceding year.

There were 1,550 telephones connected to the District system at the end of the year, and 28 in use as portable sets by fire and electrical departments, an increase of 97 in the year.

The number of cells of storage battery in service on fire-alarm, police-patrol, and local circuits remains unchanged at 2,174.

There were in service on the composite signals system (fire alarm, police, and telephone) on June 30, 1923, 172.97 miles of underground cable, containing 6,902.60 miles of conductors, and 178.45 miles of aerial conductors, a grand total of 7,081.05 miles of conductors, a net increase of 446.20 miles of conductors. Reserve capacity of cables is below requirement of demand and below safe emergency provision. Provision for expansion is again presented as an urgent requirement.

ELECTRICAL INSPECTION.

The total number of permits issued for installation of wires and apparatus for electric light, heat, and power purposes on private premises, not including distribution or other plants of public-service companies, during the year, was 9,791, compared with 8,029 in the preceding year, representing approximately 9,271 kilowatts capacity of utilization equipment. The total sum in fees paid for permits was $16,164, compared with $13,861. The annual increase of service to be rendered continues, and neither adequate nor satisfactory service can be rendered with the number of inspectors engaged.

Supervision was exercised over the erection, taking down, and moving of an aggregate of 1,555 line and 186 guy poles, and 591 pole-guy anchors, and of the stringing of overhead wires in streets and other public spaces. The total of recorded wire-supporting poles in the District at the end of the year was: Line, 20,612; guy, 1,347; total, 21,959; compared with a total of 20,914 at the end of the preceding year, a net increase of 1,054 compared with 912 and 348 for the next two preceding years, indicative of the continuance of the exceptional activity in suburban development. There has been no increase in the number of telephone poles in streets and avenues within "the prescribed area" of the act of Congress regulating the use of telephone wires in the District of Columbia, approved June 30, 1902.

MISCELLANEOUS.

The electrical department has cooperated with the municipal architect and other District officers, consulting and counseling, preparing plans, specifications, and estimates, and supervising electrical work. This service has been exceptional in extent, due to activities in school building and improvement.

HARBOR FRONT.

The annual rental of the wharves on that part of the river front under the control of the commissioners as of June 30, 1923, follows:

Washington Channel	[1] $22,763.38
Anacostia Channel	400.00
Georgetown Channel	848.00
	34,011.38

The actual water frontage of the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water front is 18 miles, of which about 8 miles is set aside for parks and for other purposes of the United States. The largest amount of wharf property under the control of the commissioners is along the Washington Channel.

The new harbor police station and dock, the dock of the fire boat, the District morgue, the municipal fish wharves and market, and the District workhouse and sand wharves are located on the Washington Channel between the south curb line of N Street and Thirteenth Street. The balance of the frontage is leased by steamboat companies, boathouses, lumber dealers, etc.

A more noteworthy project than one which would give the National Capital a useful and attractive water front could not be initiated. Civic organizations, municipal officials, and others have been advocating an improvement in the Washington water front for many years, and, notwithstanding the present policy of economy in governmental expenditures, it is believed that initial funds for this purpose should be appropriated in the near future and additional funds provided progressively each year until the project has been completed.

SEWERAGE AND SEWAGE-DISPOSAL SYSTEMS.

The construction and maintenance of the sewerage system and the sewage-disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer.

The length of main and pipe sewers constructed during the year was 12.01 miles. The total length of main and pipe sewers on June 30, 1923, was 775.98 miles, of which 153.82 miles are main sewers and 622 16 miles are pipe sewers. In addition to the above new sewer work, 108 storm-water catch basins were constructed during the year, bringing the total number to 5,883.

There was expended during the year on new extensions of the sewerage system the sum of $389,721.18, with no expenditure on the sewage-disposal system; however, $40,000 was obligated for expenditures in the fiscal year 1924. The total cost of the sewerage system to June 30, 1923, was $15,802,236.46. The total cost of the sewage-disposal system to the same date was $5,975,232.96, making a total cost of the complete system to June 30, 1923, of $21,777,469.42.

The main sewerage pumping station and the three substations were in continuous operation throughout the year, handling the sewage of practically the entire District. In addition, the main

[1] Includes receipts from rentals at the municipal fish market.

ation pumped storm water from the 900-acre low level area flanking Pennsylvania Avenue between the Peace Monument and Fifteenth Street. At the main station the combined pumpage of sewage and storm water amounted to 25,968,718,950 gallons during the year. The Poplar Point substation pumped 721,841,896 gallons, the Rock Creek substation 270,311,836 gallons, and Woodridge substation 8,284,246 gallons of sewage during the year. Eliminating the Rock Creek and Woodridge substations, which deliver their discharge to the main station, the above would indicate a mean daily pumpage of 73,124,816 gallons. The coal consumption at the main sewerage pumping station for the year amounted to 3,986 tons.

Pursuant to act of Congress approved September 1, 1916, to protect streams flowing through United States parks and reservations in the District of Columbia from pollution and the act of the Maryland State Legislature approved April 10, 1918, negotiations are continuing with the Washington Suburban Sanitary Commission governing the conditions under which Maryland sewage may be diverted through the District sewers to the District pumping stations. In advance of carrying out any terms as finally agreed upon, it will be necessary to extend the three principal interceptors to the District line at an estimated cost of $955,000.

Constant increase in the size of the sewerage system with no corresponding increase in the funds available for cleaning is causing a gradual falling behind in this work and increasing the danger of property damage during heavy rainstorms through the overcharging of uncleaned sewers; also insufficient cleaning of catch basins is resulting in rotting of sludge with a consequent health menace.

Lack of appropriations in the past has held up construction of necessary suburban trunk sewers required to provide outlets for service sewers and to properly take care of the drainage from newly paved streets until funds of approximately $3,000,000 are now required for necessary construction.

Relief sewers in the older sections of the city are urgently needed to carry off drainage not properly disposed of at present because of the inadequate size of some of the older sewers.

Attention is again called to the inability of the division to keep abreast of the building activities with proper sewer facilities. The fiscal year ended with service sewers ordered constructed for the service of new and existing buildings, estimated to cost $161,337, with all funds for the year expended or obligated.

WATER MAINS.

During the year 83,849 feet, or 15.9 miles, of water mains were laid, an increase of 4.1 miles over length laid last year, making the total length of mains now in service 674 miles, at an aggregate cost of $4,801,863.63 paid from water department funds.

WATER CONSUMPTION.

The mean daily consumption for the fiscal year was 63,982,461 gallons, giving a mean daily per capita consumption of 142 gallons, estimated on a population of 450,000.

The total pumpage for the year was 12,180,790,430 gallons.

The total coal burned was 7,632 tons.

The cost of operating pumps for the year was $115,748.16, as against $102,637.92 for fiscal year 1922; thus making the cost of pumping 1,000,000 gallons of water into the mains $9.58, as against $8.74 for the preceding year, due to the increased cost of fuel.

Underground leakage found and stopped during the year aggregated a saving of 755,000 gallons daily.

The financial statement of the water revenues and expenditures will be found in the report of the auditor.

WATER METERS.

Two thousand seven hundred and seventy-nine new meters were installed during the year. Sixty-seven thousand five hundred and sixty-seven, or 86.9 per cent of the total water services are now metered.

Very respectfully,

CUNO H. RUDOLPH,
JAMES F. OYSTER,
J. F. BELL,
Commissioners of the District of Columbia.

'ORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA.

ORT OF ASSISTANT ENGINEER COMMISSIONER WHEELER.

WASHINGTON, D. C., *September 15, 1923.*

R: I have the honor to transmit herewith the annual reports ving the operations of the various divisions and offices under mmediate supervision for the fiscal year ended June 30, 1923.

Very respectfully,

R. A. WHEELER,
Major, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.

ne ENGINEER COMMISSIONER.

REPORT OF ENGINEER OF HIGHWAYS.

WASHINGTON, D. C., *August 20, 1923.*

R: I have the honor to submit the following report of the opera- s of the engineer of highways for the fiscal year ended June 30, . The total amount of funds appropriated by Congress and sited by corporations and others for disbursement by the high- division aggregated $1,685,199.32, of which $250,000 was for ng sidewalks and alleys in all parts of the District; $233,500 for ng new roadways; $460,000 for repairing old roadway pave- ts, including asphalt resurfacing; $250,000 for repair of suburban s; $27,500 for construction and repair of bridges and viaducts; 000 for grading streets and avenues; $15,000 for sidewalks and s around Government reservations, buildings, and parks; $50,000 aving roadways under the permit system; while $364,199.32 was t in repairing pavements disturbed by other branches of the rict government and by various corporations and others.

nary of work under appropriation for improvement and repairs for year ending June 30, 1923.

lard sheet asphalt pavements	square yards	21,079.27
asphalt surface pavements	do	718.91
alt surface pavements (blanket treatment)	do	44,996.00
fied block gutter	do	1,553.77
nt concrete roadway pavements	do	42,506.42
obble and granite block removed	do	2,187.00
ite and bluestone set	linear feet	10,486.80
nt curb formed and laid	do	26,595.16
ing	cubic yards	104,671.68
nt concrete sidewalks (assessment and permit work)	square yards	46,614.32
nt concrete sidewalks around Government reservations)	square yards	4,379.45
nt concrete alleys (assessment and permit work)	do	38,873.00

The following is the list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1923.
Tables B and C.—Statement of character and extent of street pavements.
Table E.—Street improvements.
Table F.—Repairs to asphalt and coal-tar pavements.
Table G.—Work done for street railway companies.
Table H.—Work done by day labor under appropriation for "Repairs to streets, avenues, and alleys."
Table I.—Regular permit work.
Table K.—Assessment work.
Table L.—Replacing and repairing sidewalks and curbs around public reservations.
Table M.—Miscellaneous work.
Table N.—Whole cost work.
Table O.—Repairs to cuts by plumbers and others.
Table P.—Grading streets, alleys, and roads.

Of the above tables, B, C, and O are printed herewith. The remaining tables are on file in the record room of the office of the engineer of highways, plan case No. B–1139.

Unit costs of contract work showed no recession except as to concrete roadways. Funds for paving roadways were quite inadequately provided, and this fact, with the continued development of new streets by builders, created a situation little short of deplorable. There are squares of streets numbered by the dozens with no better roadways than cinders whose frontages are from 75 to 100 per cent improved by dwellings whose erection is responsive to the housing shortage.

A fund of $50,000 provided this year for the paving of roadways on deposit by the property owners of one-half the cost was entirely consumed. No funds were provided for the permanent roadway paving of our main thoroughfares, with the result that notwithstanding extravagant expenditures for upkeep traffic conditions thereon were inadequate to the plain necessities. No individual paving item was notable. At the end of the year all work appropriated for had been completed except two small items which were approaching completion under contract.

A special asphalt surface mixture designed by Major Besson was laid somewhat experimentally on certain granite-block roadways and certain fairly heavily traveled suburban macadam roadways as a part of the year's work. While it is realized that the economic justification of this process must depend on the useful life of the surface, its behavior to date has given pronounced encouragement to our hopes that it may find very general and advantageous use.

MUNICIPAL ASPHALT PLANT.

The total output of the municipal asphalt plant for the year was 211,500 cubic feet of material, consisting of 188,016 cubic feet of old material mixture and 23,484 cubic feet of topping mixture. The plant was operated for 247 days, with an average daily output of 856 cubic feet. In connection with the output of the plant the crusher was operated for 65 days during the year, and 4,210 cubic yards of old material hauled to the plant from various streets was crushed.

Constant attention is given to the maintenance of both the plant and the crusher, repairs being made and parts replaced when necessary, thereby keeping them in the best operating condition possible. This cost is incorporated in the total cost of output shown below.

The following material in amounts set forth below was purchased for use in manufacturing the output during the year:

Limestone dust, 175 tons, cost average	$4.26
Sand, 3,838.50 cubic yards, cost average	1.57
Asphaltic cement, 737.45 tons, cost average	16.10

There were purchased for use in operating the crusher and mixer the following large items:

Fuel oil, 32,411 gallons, cost average	$0.06
Coal, 193.36 tons, cost average	8.36
Wood, 80 cords, cost average	16.41

The cost of operation, including labor and material, are kept from day to day, and the summary of this data for the fiscal year develops the following unit costs for the year's operation:

Operation of crusher.

[Period of operation, 65 working days; output of crusher, 4,210 cubic yards.]

Cost of crushed product per cubic yard:	
Labor and fuel	$1.30
Maintenance, renewals, and repairs	.11
Overhead cost: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
Total cost	1.41

Operation of plant.

[Period of operation, 247 days; total output, 211,500 cubic feet.]

	Cents.
Total manufacturing cost per cubic foot:	
Labor	7.92
Fuel oil	1.14
Coal	.66
Wood	.62
Total cost	10.34
Haul from plant to street:	
Labor	8.44
On street:	
Labor	26.49
Painting joints	.27
Fuel	.30
Total cost	27.06
Maintenance and repairs:	
At plant	.76
On street	.14
Total	.90
Overhead: The orig'nal cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
Supervision:	
Foremen and overseers	4.32
Total manufacturing cost per cubic foot:	
Plant labor	10.34
Hot haul	8.44
Street work	27.06
Maintenance of plant and tools	.90
Supervision	4.32
Total	51.06

The sand used was bought under contract at 80 cents per cubic yard and hauled from the wharf to the plant at the cost of $2,965 for 3,838.50 cubic yards, or $0.77 per cubic yard, a total of $1.57 per cubic yard. All other expendable material was delivered at the plant site at the cost thereof used herein.

The cost of a cubic foot of old material from the above was as follows:

0.65 cubic foot of old material, at $1.41 per cubic yard	$0.0839
0.35 cubic foot sand, at $0.80 per cubic yard; hauled, $0.77 per cubic yard	.0216
3.33 pounds limestone dust, at $4.26 per ton	.0071
5.04 pounds asphaltic cement, at $16.10 per ton	.0405
Cost of material	.1018
Manufacturing and placing cost	.5106
Total cost per cubic foot	.6124

Topping mixture:

1 cubic foot of sand, at $0.80 per cubic yard; hauled, $0.77 per cubic yard	.0581
4.20 pounds limestone dust, at $4.26 per ton	.0089
10.08 pounds asphaltic cement, at $16.10 per ton	.0811
Cost of material	.1481
Manufacturing and placing cost	.5106
Total cost per cubic foot	.6587

The total cost of minor repairs to sheet asphalt and asphaltic concrete pavements during the year. the same representing the maintenance cost during the year, was $78,922.54. This cost represented the maintenance of all asphalt and asphaltic concrete streets not under guaranty by contractors, a total yardage of 3,552,193. The cost per square yard per year was therefore about 2.22 cents.

For purposes of record and comparison the like annual reports are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 cents; 1919, 3.07 cents; 1920, 3.38 cents; 1921, 3.75 cents; 1922, 2.69 cents.

The municipal asphalt plant began operations in 1912, repairs being made by contract during the first quarter of that year, and with the asphalt plant during the last three quarters of that year and continuously since. The marked reduction for the year 1917 is affected very significantly by the law effective that year by which repairs to pavements over one year old are chargeable to repair appropriations instead of being paid for by the paving contractors under a five-year guaranty, as formerly. The yardage of pavement over which our repairs were distributed was thus increased by nearly 700,000 square yards, on which practically no expenditures were needed, as the pavements were only from one to five years old.

In connection with these costs of annual repair it should be considered that some of the streets approximate an age of 40 years and that the average age of those we have resurfaced in recent past years exceeds 25 years. The average age of streets resurfaced in 1910 was 25.8 years; in 1911, was 24.5 years; in 1912, was 25.8 years; in 1913, was 26 years; in 1914, was 28.5 years; in 1915, was 28 years; in 1916, was 29.6 years; in 1917, was 27 years; in 1918, was 26 years; in

as 26.7 years; in 1920, was 23.6 years; in 1921, was 23.2 years; 2, was 28.7 years; there was no resurfacing done in 1923.

ng the year there was purchased from the Cranford Co., contract No. 7530, the following material in bulk at con-'s plant, to be used in connection with minor repairs to as-pavements and repairs to cuts:

bic feet of topping, at 47 cents per cubic foot	$1,432.56
cubic feet binder, at 39 cents per cubic foot	1,191.53
otal	2,624.09

material was hauled from plant and laid in the streets by strict of Columbia repair forces.

procedure was in continuation of that of the preceding year, more limited as to amount involved. The municipal plant could hardly have met the aggregate needs of our work and t subjected to the injurious strain of attempting it.

STREETS.

airs to streets, avenues, and alleys, appropriation 1923, were under the immediate supervision of the superintendent of , as follows:

idewalk relaid	square yards	10,451
block paved	do	864
block repaved	do	12,226
1 block paved	do	1,417
1 block repaved	do	3,980
set	linear feet	865
laid	square yards	70
block laid	do	5,784
walk relaid	do	6,392
	cubic yards	4,670
		$99,732.26
l		$10,462.71

SUMMARY.

est section, east of Sixteenth Street	$36,060.29
est section, west of Sixteenth Street	11,974.93
st section	21,498.35
st section	17,476.85
est section	15,596.50
town	7,588.05
otal	110,194.97

SUBURBAN ROADS.

following amounts were expended principally under the super-of the superintendent of roads, viz:

to suburban roads (District of Columbia appropriation act,	$225,000
to suburban roads (deficiency act)	25,000
nt from appropriation for repairs to streets, avenues, and , 1923	50,000
streets, alleys, and roads	35,000
roadways under the permit system	50,000
under special appropriations	98,500
Brandywine Street and Twenty-ninth Street	14,000

The work of repairs to suburban roads consisted almost entirely of maintenance of the suburban road and street system and of roadways on unimproved streets where buildings had recently been erected.

There were purchased, hauled, and spread on such unimproved streets about 25,000 cubic yards of soft-coal cinders, in addition to about 8,000 cubic yards of ashes received from the ash collections.

Repairs to the macadam roads were made principally by patching with bituminous materials and stone.

Bituminous surface treatment was given to about 652,000 square yards of macadam roads at an average cost of about 6 cents per square yard. In this treatment there were used 83,179 gallons of road oil, 72,860 gallons of tar, and 8,000 tons of gravel and stone chips.

Resurfacing with a special mixture of asphalt and sand, mixed and laid hot directly upon the bituminous surface of the macadam as a base, was done on Naylor Road from Alabama Avenue to the District line and on Pennsylvania Avenue from Anacostia River to Alabama Avenue. This was done at an approximate cost of $1.20 per square yard and gives a reasonably priced surface which will probably require little maintenance.

Tabulated statements in detail of the work are on file in the office of the engineer of highways.

Previous recommendations for paving the principal trunk highways to the District line as rapidly as funds can be provided and for legislation limiting the weights of loaded vehicles are renewed.

BRIDGES.

The expenditures from the appropriation for the construction and repair of bridges amounted to $24,890.97, and their is an obligation of about $2,300 on contract 7737 for reconstruction of Kenilworth Avenue culvert. The unexpended balance was $134.56.

The principal items of work were:

Chain Bridge, paint	$2,160.01
M Street, over Rock Creek, repair, trusses	1,142.67
Pennsylvania Avenue Bridge, over Eastern Branch, refloor sidewalk (incomplete)	3,152.19
Livingston Road, over Oxon Run, SE., rebuild (incomplete)	3,166.91
Dangerous holes and minor repairs	3,659.01
Salaries	5,997.86
Lumber (estimated)	4,476.31
Construction materials, other than lumber	3,148.27

The appropriations for Anacostia and Highway Bridges were expended practically in full.

EXPENDITURES FOR BRIDGE REPAIRS, PAINTING, CONCRETE WORK, ETC.

Repairs to N Street oil trestle, by day labor	$317.68
Emplacement of concrete filler and installation of steel ties between track girders on the N Street stone trestle, by day labor	406.60
Painting of various lamp-posts with route marks, by day labor	996.74
Construction of 2 clearance gauges at the Highway Bridge, completed by day labor	878.51
Removal of existing old piles and portion of old pier at Wharf No. 6, completed by day labor	271.44
Construction of drainage ditch adjacent to the Anacostia River Bridge, completed by day labor	150.12
Raising footways of Calvert Street Bridge to conform to new roadway floor, by day labor	211.62
Replacement of fence at Wharf No. 6, completed by day labor	14.88

Construction of timber runway at Wharf No. 6, completed by day labor	$166.17
Contract with the Allen H. Rogers Co., for construction of nine reinforced-concrete stalls at the District stone trestle, completed	11,579.57
Contract with Royal J. Mansfield for construction of 12 reinforced-concrete bins at the District stone trestle, completed	15,062.60
Contract with Royal J. Mansfield for repairs to Calvert Street Bridge over Rock Creek, completed	20,221.09
Contract with the Cambridge Manufacturing Co. for construction of reinforced-concrete wharf deck at Wharf No. 6, completed	14,665.69
Contract with Becker & Chapman Co., removal of old piles and furnishing and driving new fender and cluster piles at Wharf No. 6, completed	2,361.31

A contract was entered into with the Pamfilis Construction Co. for painting three spans of the Anacostia River Bridge. The work is in progress.

The William F. Cush Co. contracted for reconstruction of culvert in line of Kenilworth Avenue NE., north of Benning viaduct. This work also is in progress.

Details of the above expenditures are filed in the office of the Engineer of Highways as B-1139.

STABLES.

The engineer stables, housing 55 horses and 21 mules, are located at U Street NW., between Sixteenth and Seventeenth Streets, and First and Canal Streets SW. The animals are assigned to the various departments as follows:

Sewer division	20
Repair shop	21
Repairs to cuts	22
Sealer of weights and measures	1
Electrical department	2
Total	76

Number of annual employees: 1 superintendent, 1 blacksmith, 2 drivers, 2 watchmen.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

Very respectfully,

C. B. HUNT,
Engineer of Highways.

ASSISTANT TO THE ENGINEER COMMISSIONER.

TABLE B AND C.—*Character and extent of roadway pavements, July 1, 1923.*

SQUARE YARDS.

Section.	Asphalt.	Asphaltic surface.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete.	Durax block (small granite block).	Granite and rubble.
Northwest	1,819,241	2,322	25,323	9,674	6,372	20,999	12,294	94,305
Northeast	415,575	.....	193,962	3,127	.....	11,875	.....	17,601
Southeast	262,954	.....	238,437	8,019	4,082	2,509	.....	37,199
Southwest	286,102	13,264	40,436	13,535	.....	11,148	.....	136,374
Georgetown	156,171	.....	23,076	4,144	905	.....	5,674	30,492
Northwest suburban	391,975	6,311	81,046	25,855	31,798	208,661	.....	17,634
Northeast suburban	90,255	.....	6,925	14,354	.....	36,136	.....	.....
Southeast suburban	21,203	23,099	.....	.....	3,049	12,933	.....	1,000
Total	3,443,476	44,996	612,205	78,708	46,206	304,211	17,968	334,605

TABLE B AND C.—*Character and extent of roadway pavements, July 1, 1923*—Con.

SQUARE YARDS—Continued.

Section.	Vitrified block.	Cobble.	Macadam (estimated).	Gutters on asphalt streets.	Gutters on asphaltic concrete streets.	Pavements maintained by street railroads.	Total.
Northwest	9,855	5,763	20,939	119,662	1,128	287,110	2,434,987
Northeast	3,882	.....	30,416	32,955	231	69,316	778,[illegible]
Southeast	.....	13,122	45,465	18,316	838	48,328	679,[illegible]
Southwest	3,138	7,070	10,136	24,527	1,254	56,8[illegible]0	603,[illegible]
Georgetown	515	10,419	3,000	5,979	498	35,3[illegible]5	276,198
Northwest suburban	.....	.....	1,298,109	28,710	5,260	54,765	2,153,124
Northeast suburban	.....	.....	377,598	6,383	1,049	9,000	541,700
Southeast suburban	.....	.....	50,563	6,385	272	7,370	125,[illegible]
Total	17,390	36,374	1,836,226	242,917	10,590	568,034	7,[illegible],906

MILEAGE.

Section.	Asphalt.	Asphaltic surface.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete.	Durax block (small granite block).
Northwest	93.52	0.20	1.57	0.51	0.24	1.15	0.30
Northeast	21.77	.....	8.58	.19	.....	.80	.....
Southeast	13.93	.....	11.93	.43	.17	.16	.....
Southwest	15.31	.66	2.37	.68	.....	.36	.....
Georgetown	9.30	.....	1.51	.49	.06	.....	.27
Northwest suburban	21.86	.29	4.52	1.31	1.79	11.37	.....
Northeast suburban	5.64	.....	.63	.97	.....	2.00	.....
Southeast suburban	1.83	1.97	.....	.....	.21	.51	.....
Total	183.36	3.12	31.11	4.58	2.47	16.35	.57

Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unimproved (estimated)	Total.
Northwest	5.25	0.50	0.08	0.90	2.54	106.76
Northeast	.87	.24	.....	1.60	4.02	38.07
Southeast	2.14	.....	.66	2.15	6.33	37.90
Southwest	7.09	.27	.30	.49	2.62	30.35
Georgetown	2.12	.03	.48	.06	.76	15.08
Northwest suburban	.84	.....	.....	81.72	56.96	180.66
Northeast suburban	.....	.....	.....	27.12	46.68	83.04
Southeast suburban	.04	.....	.....	3.72	36.60	44.88
Total	18.35	1.04	1.52	117.76	156.51	536.74

TABLE O.—*Number of square yards and cost of repairs to cuts in various streets, sidewalks, and alleys during the fiscal year ending June 30, 1923, chargeable to plumbers, public-service corporations, individual depositors, and appropriations of the District and Federal Governments.*

	Flat rate.	Whole cost.	Total.
Plumbers	$21,840.79	$154,340.45	$21,840.79
Public service corporations	61,697.02	145,340.45	216,037.47
Individual depositors	21,808.68	.....	21,808.68
Various appropriations of the District and Federal Governments	57,951.30	46,561.08	104,512.38
Total	163,297.79	200,901.53	364,199.32

TABLE O.—*Number of square yards and cost of repairs to cuts in various streets, sidewalks, and alleys, etc.*—Continued.

	Flat rate.	Whole cost.
Square yards repaired:		
Sheet asphalt	$5,231.01	$6,761.09
Vitrified block	1,438.03	5,034.78
Asphalt block	1,881.80	5,792.73
Granite block	1,037.62	2,522.53
Cobble	205.12	168.19
Cement sidewalks	17,835.62	.....
Brick sidewalks	5,166.00	8,328.55
Macadam	3,131.68	2,303.36
Durax block	26.72	6,692.55
Scoria block	24.20	6,240.99
Concrete roadways	5,257.51	.....
Total	41,235.31	44,134.77

REPORT OF THE INSPECTOR OF ASPHALTS AND CEMENTS.

WASHINGTON, D. C., *September 1, 1923.*

SIR: I have the honor to submit the following report of operations of this division during the fiscal year ending June 30, 1923. Total number of samples tested, 10,065; record of each on file in office.

In addition to the above there were 2,951 experimental tests made of asphalts, sands, gravel, concrete, etc., in connection with special experiments carried on under the personal supervision of former assistant to the engineer commissioner then in charge of these laboratories; record thereof also on file in this office.

ASPHALT PAVEMENTS.

There were laid by the Cranford Paving Co. and the Corson & Gruman Co. approximately 21,079 square yards standard asphalt roadways, using Aztec, Standard, and Bermudez asphalt.

In addition to the above there was also laid by the same contractors approximately 69,734 cubic feet, equaling 44,966 square yards, of asphalt concrete; this in resurfacing old macadam roadways.

In this material concrete sand is used in lieu of asphalt sand, as used in standard asphalt, the material consisting of approximately 65 per cent concrete sand, 25 per cent limestone dust, and 10 per cent asphalt cement.

This is the second year mixture of this kind has been used by the District; a small quantity was first laid in year 1922. All laid has thus far proven satisfactory.

PORTLAND CEMENTS.

Number of samples tested, 8,946, representing 89,468 barrels, all of which complied with specifications.

Nine tables showing in detail materials tested, results thereof, and by whom submitted are on file in this office.

Very respectfully,

J. O. HARGROVE,
Inspector of Asphalts and Cements.

ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS.

WASHINGTON, D. C., *August 24, 1923.*

SIR: I have the honor to submit my annual report dealing with the operations of the trees and parkings division for the fiscal year ended June 30, 1923.

TREES PLANTED.

Fifty-eight trees were planted in their permanent position on the streets during the fiscal year. Thirty of these were planted on the west side of Nineteenth Street NW., between Virginia Avenue and New York Avenue, and on the east side of Nineteenth Street NW., between C and E Streets, to replace trees that were removed because they interfered with street improvements; and the remainder were planted for the purpose of filling vacancies in the existing lines. The planting of trees during the year had to be abandoned due to the fact that we were compelled to abandon the tract of ground used as a nursery on reservation No. 13 because of construction work on the Gallinger Hospital, and also the loss of a tract of ground owned by the District of Columbia located at the intersection of Iowa Avenue and Webster Street NW. The loss of the last-named site was a serious blow. Many fine trees of the proper size for transplanting to their permanent position on the streets and many others which could have been planted on the streets in the next two or three years were totally destroyed. The cost of planting 25 trees was paid for from the appropriation for the parking commission, 31 from the appropriations for other departments, and 2 from whole-cost deposits. These trees were planted at the curb line.

TREES REMOVED.

The unfavorable city conditions make the life of a street tree a hard one, and hundreds of trees die annually because of injuries over which this department has no control. The generally poor condition of the soil along the streets is the chief source of injury to shade trees. The soil is continually being impoverished by the growing trees, and we are unable to fertilize them because of cement walks and pavements. A total of 1,621 trees was removed during the year for various reasons.

Of the 1,621 trees removed during the year, 481 were decayed and dangerous; 5 were of inferior and condemned varieties; 14, to relieve excessive shade; 1, interference with parking improvement; 131, street improvements; 40, for driveways; 14, improvements to alleys; 32, destroyed by automobiles; 136, storms; 2, interference with entrance to buildings; 8, close proximity to buildings; 5, interference with building operations; 11, injurious to curb trees; and 1, interference with the construction of water main. It was ascertained that 52 trees were destroyed by illuminating gas; 46, salt water; 53, abnormal moisture supply; 37, by being filled around; 33, by being girdled; 33, by drought; 1, by insects; 38, by root mutilation; 14, by oil; 1, by sewer gas; 28, by horse bite; and the deaths of 404 were unexplained.

Of the number removed, 1,354 stood at the curb line, 158 in the parkings, 60 in the sidewalk, 13 in alleys, 34 in roadways, 1 in playgrounds, and 1 on private property.

e cost of removing 1,424 trees was paid from the appropriation he parking commission, 105 from the appropriations for other rtments, and 92 from whole-cost deposits. The cost of removing rees paid from the appropriation for the parking commission nted to a total of $5,106.83.

TREES SPRAYED.

e trees of this city suffer each year from the attacks of insects, ipally the elm-leaf beetle, the tussock moth, and the fall web-. The insects mentioned make their appearance annually, but rious damage is done, due to the efficient spraying. Solutions of ate of lead are used, and this has proved to be the most effective od of dealing with the leaf-destroying insects, since it poisons food supply. This office has sprayed 41,755 trees during the for the extermination of leaf-eating insects. This work was rmed at a total cost of $2,361.23.

NURSERIES.

hort time after the beginning of the fiscal year this department l itself without adequate nursery facilities to properly take care placements and extensions that would be needed to plant trees ep pace with the rapid growth of the city. The nursery which department maintained for a good many years on reservation 3 has been almost wholly destroyed by the erection of the Gallin- Hospital on that site. The erection of a school building at Four- n and Upshur Streets NW. caused this office to abandon that site. trees, both in the nursery rows and seed beds, were totally oyed.

September, 1922, the Chief of Engineers, United States Army, ed permission to the Commissioners of the District of Columbia as a tree nursery the tract containing 34.5 acres of the reclaimed along the Anacostia River, situated immediately upstream from ng Field. On September 25, 1922, this office started to work ring seed beds, plowing, and fencing, etc., on this site. One and two hundred elms, 173 pin oaks, and 700 red oaks were set the nursery rows at this location. These trees were about 3 to in height, and it will be four or five years before they can be planted to their permanent position on the streets. The sum of 0.97 was expended during the year in the development of a ry on the new site.

is department transplanted 287 elm trees, 17 Norway maple, l maple, and 105 sugar-maple trees from the seed beds to the ry rows at Fort Dupont nursery.

e sum of $3,032.87 was expended during the year to plant, culti- and trim the young trees in the nursery rows and seed beds at Dupont nursery site.

TRIMMING.

great deal of trimming is required on street trees to prevent encroachment on buildings and their interference with street idewalk traffic. This operation in all cases is not considered

best for their welfare, but it is necessary for the reasons stated. During the year the systematic trimming of trees was undertaken, and commencing at Eighteenth Street as the eastern limit, with B Street and Florida Avenue as the south and north boundaries, the work was continued westward to and including all streets in Georgetown. In the area covered by this treatment all trees were cleared of dead, low, and otherwise objectionable branches, with the result that they were much improved in appearance. Owing to the lack of funds and our inability to obtain labor on this class of work, it was not practicable, without neglecting other urgent work, to cover more territory than this, but it is a matter of growing importance that all of the larger trees should receive this attention annually. The silver maples are responsible for the largest outlay in trimming, this species having been planted years ago to the exclusion of many kinds whose subsequent use has proved more advantageous. This tree as a street variety is noted for the early decay of its branches and requires close attention to keep in proper condition. In addition to the above, a small force of men accomplished much trimming on individual requests. The large increase in the scattered work noticeable during the year has taxed to the utmost the efforts of the small force engaged upon it.

A total of 12,667 trees was trimmed during the year at a total cost of $7,756.68.

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES.

The cultivation of young trees is absolutely necessary to insure good growth in young specimens, allowing them to derive the fullest benefit from rainfall. The value of cultivating young trees is not fully appreciated. It is not only beneficial to the young trees, but also destroys a rank growth of weeds that would otherwise spring up around them, and thus give the tree space an unsightly appearance. The keeping of the ground loose allows air to reach the roots, renders more available the plant food the soil contains, and prevents the rapid evaporation of moisture. A total of 401 young trees was cultivated during the year at a total cost of $66.97.

The necessity being recognized to rid the city of as many weeds as possible, it became necessary for this department to mow many uninclosed public parkings throughout the city. This work was performed at a total cost of $4,793.11.

This office mowed the grass on the lawn in front of the District Building and the park in front of the Center Market at Seventh Street and Pennsylvania Avenue NW. at various times in addition to the removal of the weeds along the streets.

Two hundred and eighty-seven old wooden tree boxes and 44 iron tree guards were removed from around large trees that no longer required this protection.

PAVING OF ABANDONED TREE SPACES.

The work of paving abandoned tree spaces throughout the city was performed by the surface division, engineer department, and the cost of the same was paid from the appropriation for the parking commission. A total of $134.87 was spent on this work.

REGULATION OF TERRACES.

This office examined and issued 1,355 permits affecting the grade of terraces in connection with building operations during the year. This office was relieved of the duty of passing on terraces in the first and second commercial and industrial districts near the end of the fiscal year. The regulation of the parking in the residential district is still under the jurisdiction of this department.

GENERAL COMMENT.

The most urgent need of the division of trees and parkings is a permanent nursery, instead of temporary permission to occupy some site on which we must spend thousands of dollars, only to be ousted just as we are in a position to supply the arboreal needs of the city. The erection of the Gallinger Hospital on reservation No. 13 deprived the department of its nursery, in which more than 80 per cent of the trees of Washington were raised. Following this, the loss of the nursery at Georgia Avenue and Upshur Street, which we were required to vacate and reoccupy on two different occasions, cost us thousands of dollars in stock, such as seedlings and seed beds. We are now located at Fort Dupont, a most desirable site, on which trees have been raised in half the time required on the aforementioned sites; but there is not enough ground, and this site, too, must be vacated in time, as it is occupied by a temporary permit from the Federal Government. We have also started operations on another loaned site, on the Anacostia River upstream from Bolling Field. Here we have spent already hundreds of dollars, although it is to be doubted whether this low land, with the water table so near the surface, will produce the hardwood trees, such as the Norway maple (Acer platanoides) and red oak (Quercus rubra), which are desirable for street planting. The elm (Ulmus Americana) will undoubtedly grow on this ground, which is very fertile, but lacks a hardpan to prevent roots from growing to too great a depth, in which case trees can not be dug with sufficient roots to sustain them on the streets where there is an absence of moisture. Where there is a hardpan, such as is usually found in upland ground, a compact root system is formed, which makes transplanting economical and successful.

Hundreds of dollars have been spent on the new site for road building, fencing, building of a barn, running of a water main, clearing and preparing ground, etc. The money expended in occupying these various sites temporarily would more than purchase a permanent nursery; and it would seem that the most desirable step in point of economy would be the purchase of additional ground at Fort Dupont, where land is cheap and highly suitable for our needs.

The recent transfer of our stables and shops to the United States Botanic Gardens, without provision for our own needs, has been another loss to the department. It is only by the exercise of careful and economical management that we have been able to keep the department in working order and care for the existing trees. I know of no money spent in support of the city that, dollar for dollar, gives

such satisfactory returns in beauty, comfort, and health as does the very small amount spent annually on the trees; and more money could, with wisdom, be invested in this worthy cause.

Summary.

Curb trees on streets at close of fiscal year 1922	105,889
Net decrease of curb trees during fiscal year 1923	1,296
Curb trees on streets at close of fiscal year 1923	104,593

C. LANHAM,
Superintendent of Trees and Parkings,
District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER,
District of Columbia.

REPORT OF THE CITY REFUSE DIVISION.

WASHINGTON, D. C., *July 21, 1923.*

SIR: I have the honor to submit the following report of the operations of the city refuse division, engineer department, for the year ended June 30, 1923.

The outstanding and interesting feature of this work was the amount of money returned into the Treasury from products sold. There was received from—

Garbage grease	$221,086.43
Garbage tankage	3,248.26
Salvaged trash	129 676.35
Manure	2,161.36
	356,172.40

This exceeds anything ever done in past years, and is to be accounted for by the large amount of garbage handled and by the good prices received for grease and baled paper.

The appropriation for the collection and disposal of city refuse was $800,000, so that the return was 44½ per cent of this sum, or the actual expense of collecting and disposing of all city refuse (other than street cleaning material) was slightly less than $444,000.

The collection and disposal of 145,432 cubic yards of ashes was a total loss with no salvage, except in so far as certain streets and alleys were improved by deposited ashes in them, and cost $117,727.67. The amount paid to contractors for the collection and disposal of night soil and of dead animals was $20,860. Salaries not allocated to any particular service were $8,940. So that the expense of the collection and disposal of garbage and trash was $641,449.81, as follows:

Garbage collection cost	$251,522.04	
Garbage reduction cost	179,507.16	
Cost of garbage service		$431,029.20
Trash collection cost	100,175.97	
Trash disposal cost	110,244.64	
Cost of trash service		210,420.61
Total cost of garbage and trash		641,449.81
As indicated, the revenue derived from these two sources was		354,011.04
Making the expense of these two services		287,438.77

cluded in this sum is $55,000 expended in betterments to plants in the purchase of equipment. So that the net cost of garbage ice for the year was $187,314.43 and of the trash service $51,087.38. ie above showing, it is felt, warrants the expenditure in placing e revenue-producing plants in good running order and in the pro- n of proper and adequate equipment to do the work economically. ie appropriation for dust prevention and cleaning of streets and s was $375,000. The tables appended hereto show the yardage ied by the several different methods and the cost of each.

uring the winter there were three light snows which gave the de- ment the opportunity to try out the snow law enacted by Congress ie previous session. When the sidewalks were not cleaned by the pant of the abutting property, the work was done by the District 767 returns of such expenditures were forwarded to the corpora- counsel for collection as provided for in the statute.

ie expenditure by this division from the appropriation of $10,000 r this act was $6,832.08.

uch credit for the showing made this year is due my assistants, I hereby desire to acknowledge my appreciation of their loyal successful efforts.

MORRIS HACKER,
Supervisor City Refuse.

SISTANT TO THE ENGINEER COMMISSIONER.

Cost of street cleaning, July 1, 1922, to June 30, 1923.

	Area (square yards.)	Cost.	
		Amount.	Unit per M.
e cleaning, motor	49,197,000	$13,065.07	$0.266
e cleaning, horse	65,451,000	19,534.74	.298
leaning	53,082,000	39,392.12	.624
an cleaning	39,234,000	18,024.78	.459
atrol	1,466,464,000	204,983.34	.140
lushing	72,625,000	8,795.66	.121
eeing	59,940,000	11,845.35	.198
ing		4,989.35	
nen		2,865.20	
y accounting		2,145.60	
paper boxes		5,088.77	
nd ice		8,838.25	
overhead		1,244.22	
cleaning		2,263.42	
otal		343,075.87	

Comparative data in connection with street-cleaning work, 1919 to 1923.

SQUARE YARDS CLEANED.

	1919	1920	1921	1922	1923
Hand patrol	748,142,000	1,173,802,000	1,323,163,000	1,357,169,000	1,466,464,000
Machine, horse	218,682,000	98,350,000	119,256,000	66,194,000	65,451,000
Machine, motor	.....	.....	.....	45,140,000	49,197,000
Alley cleaning	57,208,000	55,344,000	69,090,000	57,288,000	63,082,000
Suburban streets	32,876,000	34,550,000	60,382,000	50,221,000	39,234,000
Squeegeeing	89,868,000	111,008,000	127,596,000	94,650,000	59,940,000
Flushing	5,539,000	24,433,000	40,842,000	48,223,000	72,638,000
Motor flushing	12,213,000				

DIRECT TOTAL COST.

	1919	1920	1921	1922	1923
Hand patrol	$195,665.33	$237,490.76	$253,485.93	$208,573.06	$204,982.34
Machine, horse	77,555.50	40,915.64	48,237.93	20,337.33	19,334.74
Machine, motor	.....	.....	.....	9,974.13	13,065.67
Alley cleaning	45,118.53	44,239.33	45,696.39	35,171.92	39,392.11
Suburban streets	20,540.42	24,231.40	33,372.65	19,887.76	18,024.78
Squeegeeing	20,929.32	24,743.81	27,684.70	14,286.34	11,845.35
Flushing	2,757.63	6,835.91	7,424.31	6,498.78	8,795.86
Motor flushing	4,418.61				

COST PER 1,000 SQUARE YARDS.

	1919	1920	1921	1922	1923
Hand patrol	$0.261	$0.202	$0.192	$0.154	$0.140
Machine, horse	.354	.416	.404	.307	.306
Machine, motor	.....	.....	.....	.221	.266
Alley cleaning	.789	.800	.661	.614	.624
Suburban streets	.625	.702	.549	.395	.459
Squeegeeing	.233	.223	.217	.151	.198
Flushing	.497	.279	.182	.135	.121
Motor flushing	.361				

Comparative data in connection with disposal of all city wastes from 1919 to 1923.

NUMBER OF UNITS COLLECTED.

	1919	1920	1921	1922	1923
Garbage.....tons..	53,258	52,793	60,058	69,452	80,414
Ashes.....cubic yards..	134,673	148,228	135,940	156,100	145,432
Miscellaneous refuse.....do....	149,650	170,286	148,908	196,763	190,021
Night soil.....barrels..	11,111	12,734	12,507	14,190	15,217
Dead animals.....number..	19,974	19,995	24,704	28,675	30,120

TOTAL NET COST.

	1919	1920	1921	1922	1923
Garbage	$267,662.54	$178,311.57	$283,406.63	$210,268.15	$187,314.63
Ashes	100,300.00	114,248.38	116,421.04	135,267.18	117,722.67
Miscellaneous refuse	51,204.00	46,522.26	66,029.59	107,439.84	51,087.38
Night soil	17,500.00	17,500.00	17,500.00	17,500.00	17,500.00
Dead animals	3,360.00	3,360.00	3,360.00	3,360.00	3,360.00

MISCELLANEOUS DATA ON CONTRACTS.

Class of waste.	Contractor.	Period of contract.	Date of expiration.	Price per annum.	Collected from—
Dead animals	Chas. F. Mann	5 years	June 30, 1923	$3,360	Every part of the District.
Night soil	Warner Stutler	do	do	17,500	All privies in the District.

REPORT OF THE SURVEYOR.

WASHINGTON, D. C., *August 30, 1923.*

SIR: The report herewith attached is for the operation of the surveyor's office for the year ended June 30, 1923. This report will include all condemnation cases for streets, alleys, and parks.

It might be said that the work of this office is divided into three classes:

1. Work done for private parties, for which a fee is charged, the amount charged being regulated by a schedule of fees approved by the commissioners.

2. Work done for the various coordinate departments of the District and for the Federal Government. No fee is charged for this class of work.

3. Surveys, descriptions, and preparation and report covering all condemnation cases for streets, alleys, and parks.

The first class of work, or private work, for which a charge is made, has greatly increased over any previous year. This increase has been continuous since the close of the war, and has grown to such proportions that the office force can not perform the work promptly and satisfactorily to the public.

A few illustrations will show the increase of this class of work: Lots or parts of lots surveyed during the past year showed an increase over those surveyed the year previous, from 5,043 to 6,065; surveys to verify walls under construction from 1,700 to 1,893; individual lots inspected where new buildings are being erected, from 3,022 to 3,305; total number of lots created, from 3,878 to 4,632; estimates or orders for work to be done from 11,320 to 12,659; plats prepared for private parties 8,658 to 10,308; the total number of surveys, from 4,135 to 5,122; and the total number of plats drawn, from 12,100 to 14,669.

It will be noted that the number of orders for work received during the past year represents an average of 44 orders per day, which represents an increase far in excess over any previous year.

The total receipts for the year immediately preceding the past fiscal year amounted to $40,503.80, as compared with $48,461.90 for past fiscal year. This is much in excess of the appropriation for the maintenance of this office. While it has never been assumed that the office should even be self-sustaining, for the reason that much work is done for the Government, and a large part of the time of the office force is consumed in furnishing the public with free information, this fact is pointed out as an interesting feature as tending to show just what the office has been accomplishing. It is not fair to ask the office force to bear this increase in work from year to year and not have any corresponding increase in the force. This work should be done promptly, for frequently important building operations and transfers of property involving large sums of money depend upon the prompt execution of the work, and where the private citizen pays for the service he is entitled to and should receive prompt service. This is impossible to do with the present inadequate force.

The following table is submitted for your information, showing a comparison of the work between the fiscal years 1921–22 and 1922–23:

	Fiscal year 1921–22.	Fiscal year 1922–23.
For private parties:		
Individual lots or parts of lots surveyed in city and county	5,043	6,065
Certificates of survey issued covering one or more lots	2,227	2,880
Duplicates of above recorded in survey certificate books	2,227	2,880
Separate surveys made to verify walls	1,700	1,893
Postal-card reports concerning walls issued to owners	1,700	1,893
Individual buildings inspected as to location of walls	3,022	3,305
Large tracts in county surveyed, subdivided, and recorded	21	12
Outline surveys in county of unsubdivided tracts	78	202
Subdivision plats prepared in duplicate	532	587
Duplicate subdivisions prepared for assessor	532	587
Subdivisions recorded	470	496
Total of individual new lots in subdivisions	3,878	4,612
Plats of one or more recorded lots to accompany applications for building permits (commonly called "building plats"), in duplicate	5,648	6,452
Plats made up under regulations for theaters, garages, etc	152	175
Estimates of cost issued in triplicate	11,320	12,659
Plats made up on order of private parties	8,658	10,308
Total of fees paid to collector of taxes by private parties	$40,503.80	$48,461.90
For the District of Columbia:		
Surveys made for the District of Columbia	109	135
Plats recorded (condemnations, dedications, etc.)	69	101
Reports concerning walls to building inspector	1,700	1,893
Assessment and taxation plats recorded	415	709
Miscellaneous:		
Total of surveys for the District of Columbia and private parties	4,135	5,122
Total pf plats, public and private, including plats drawn in books	12,100	14,669

HIGHWAY PLAN.

The appropriation of $2,000 for marking permanently on the ground the permanent system of highways has been expended by running out various street lines and marking the street corners by permanent monuments. About 125 granite monuments have been placed at different parts of the District, marking the street plan. Some of the more prominent streets marked are Alabama Avenue, Benning Road, Forty-sixth Street, Division Avenue, Sheriff Road, and South Capitol Street.

This appropriation has been advantageously expended and should be continued. It facilitates future surveys, and is a guide to property owners in determining the location of the street plan.

Changes in the highway plan can be made after plans providing for such changes are drawn up by the Commissioners of the District of Columbia and approved by the highway commission, composed of the Secretary of War, the Secretary of the Interior, and the Chief of Engineers, United States Army, and certain other legal requirements carried out, such as advertisement, hearing by commissioners for parties concerned, etc.

There have been several of these changes made during the past year, and the plats covering same approved and recorded in this office as follows:

1. Seventeenth Street between Blagden Avenue and Colorado Avenue NW.

2. Crittenden Street between Sixteenth Street and Seventeenth Street NW.

3. Alabama Avenue between Thirty-first Street and Pennsylvania Avenue SE., Austin Street east of Thirty-second Street SE. (eliminated), Suitland Road south of Bowen Road SE.

. Alabama Avenue (Hamilton Road) between Twenty-second eet and Twenty-fourth Street SE.

SUBDIVISIONS.

Much activity is shown in the subdivision of agricultural land o building lots, due to the great building activity now going on the District, and in this connection it was deemed advisable to re-e the subdivision regulations. Accordingly this office submitted evision, which was approved by the commissioners and has been blished in pamphlet form.

The number of subdivisions prepared by this office during the past al year was 587. This was an increase of 55 over the previous r. The number of subdivisions recorded was 496, which was an rease of 26 over the previous year. For every subdivision pre-ed there is a duplicate copy made for the records of the assessor's ce.

CONDEMNATION CASES.

During the past year there have been before the courts 42 street and rk condemnation cases and 17 alley cases. During the year 23 w condemnation street and park cases have been filed and 12 new ey cases; 13 street and park cases have been confirmed and 9 ey cases. The magnitude of this will be shown by the amount of mages allowed for the property taken. The total damages allowed property taken for streets, parks, etc., was $130,780.39, and $14,-0.64 for alleys.

The more important cases considered during the past year were: tablishment of building restriction lines on Kalorama Road, yoming Avenue, Thirteenth and Fourteenth Streets, and the ening of Legation Street, Eastern Avenue, Fifteenth Street, mlin Street, Southern Avenue, Jenifer and Forty-second Streets, urteenth Street, streets in Barry Farm (east of Nichols Avenue), nth, Street, Underwood Street, Tuckerman Street, and many ers.

There is some criticism to the opening of streets by condemna-n in which the entire cost is assessed as benefits, but it is believed t this law is a very great benefit in developing the District in orderly, comprehensive way. Careful consideration is always en to the importance and necessity of the case, and at the same e realizing that it is in the interest of economy to secure the land ore it is improved by some obstructions or increases in value. is increase would only add to the burden of the property owner, o ultimately has to pay the cost. The property owner always has protection in court, so it is believed no injustice can be placed n him.

Other condemnation cases will be considered during the coming r and forwarded to the commissioners as the necessity arises, en the exigencies of the case justify such action. Some of the re important cases being considered at this time are the widening Broad Branch Road from Rock Creek to the District line, the lening of Benning Road east of Benning, the widening of Sheriff ad and Canal Road west of Georgetown. These are important

lines of travel that should be widened before the physical improvement makes the cost prohibitive.

It is not possible to open many of the important proposed streets under the present law where substantial improvements are in the line of the projected street. This would make the assessment for benefits so great that the property owners could not equitably stand the assessment for benefits. In all such cases there should be an appropriation to bear part of the cost. Many localities have been retarded in development by reason of streets being thus blocked, and the sooner there is some provision made for opening the streets through these spots the better it will be for the development of the street plan and the orderly growth of the city.

A table showing the street, park, and alley condemnation cases on the court docket during the past year and those filed and confirmed during the year is on file in this office.

PARKS.

The L'Enfant plan of the Federal city of 1791 provided for a magnificent street and park plan. This plan stopped at what was Boundary Street (now Florida Avenue), beyond which there is no park plan, and if provision is not made for the acquisition of land for parks over this area there will be a great lack of parks, and it will be in no proportion to the park area of the original Federal city.

No land may be subdivided without conforming to a street plan, but there is no such provision for parks. There are many beauty spots where magnificent trees exist which should be acquired before the rapid development of the city destroys them.

The new Washington being created beyond Florida Avenue will not have the liberal park area the old Washington has, and it is certainly a reflection upon the present generation not to provide for more recreation space for the future population of this rapidly growing city.

While it is believed that a comprehensive park plan would be desirable, this office has, however, from time to time recommended specific tracts for parks where there is danger of their being lost to the park system. These are Piney Branch Parkway east of Sixteenth Street, Klingle Road Valley, and Patterson tract. Especially do I wish to call your attention to the rapid encroachment upon Piney Branch and Klingle Road Valley. They have already been much reduced in area, and it is my firm belief that Piney Branch Parkway will be lost if not acquired within the next year.

Klingle Ford Valley should be made the link connecting Potomac Park on the south with Rock Creek Park on the north. This would eliminate the necessity of traffic passing through the Zoological Park, which is a playground for children, where traffic should be restricted. If this link is acquired, it will make a continuous park from Haines Point, at the extreme south end of Potomac Park, to the extreme north end of Rock Creek Park, at the northerly boundary of the District. There is probably nowhere to be found such a beautiful chain of parks, with its varying scenery, from the natural, rugged, wooded hillsides to the beautifully created parks along the Potomac.

CIVIL WAR FORTS.

Steps should be taken to preserve and connect the various 40 or more fort sites and batteries which were constructed for the defense of Washington during the Civil War. Some have already been destroyed by the progress of improvements, but some are still well preserved. All are of great historic interest. Beautiful boulevards on high ground overlooking the city should be constructed connecting these sites.

SMALL PARKS.

The appropriation for small parks to be acquired at the intersection of streets has been reduced from time to time from $25,000 to $5,000 for the current year. Many of such small areas have been acquired, and a number have been beautified, much to the betterment of the neighborhood in which they are located. The acquisition of these small areas frequently prevents the construction of some cheap and unsightly improvements.

There were 24 small park areas before the courts for condemnation during the past year, some of which have been confirmed. It is believed that this appropriation should be increased and continued.

STREET PARKING.

In the annual report of this office of last year attention was called to what was believed to be a desirable thing to accomplish, that is, to have a uniform treatment for parking space within the street lines in the residential districts.

A specific case might be called to your attention by citing Sixteenth Street. The title to this land is in the Federal Government, under the jurisdiction and control of the commissioners. The property owner has the benefit of this parking area in his front yard, for which he pays no rent or taxes. It is believed that this area might be beautified and the appearance of the residential streets much improved.

To convince one of this is to examine the parking in some newly developed subdivision, where the promoter has developed the parking area himself in some uniform method. It is far in advance in its appearance to the older parking space where no attempt has been made to uniformity. In the latter case, some are on terraces and some are without terraces, and some are without fences or hedges, and some with fences, or hedges; in fact, one might find all conceivable kinds of treatment. It is believed that each block, where practicable, should be similarly treated and the appearance of the city thereby much improved.

It is believed that legislation would be necessary to accomplish this result, and an initial appropriation may be needed, after which it might be reimbursed by assessment against the abutting property owners similar to the establishment and maintenance of sidewalks.

OFFICE FORCE.

Attention was called to the necessities of this office in the estimates submitted for the next fiscal year.

I wish to acknowledge the credit due the employees of this office for the efficient service rendered during the past year. Many of the old employees have become experts in their line of work and deserve more consideration in the matter of pay.

MELVIN C. HAZEN, *Surveyor.*

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, D. C., *August 15, 1923.*

SIR: During the past year the most important work of the department, examination and checking of plans, has been handled by an entirely new organization. The force of engineers and computers, previous to their employment in this department, were, with the exception of one man, without any practical experience and training.

Many of the plans presented involve the most complex structural details, requiring the most careful analysis and computation. By close supervision of the work of this branch of the department, by personally checking some of the most important plans, delay in issuance of permits was reduced to a minimum consistency with accurate and complete checking of the essential structural details.

By close application and by intelligent appreciation of the work coming before them during the year, the engineering force at this time has reached a state of efficiency which qualifies them to pass upon any work of a structural nature that comes before the department.

At the peak period these men worked early and late, and at times on Sundays, to expedite the work and to minimize the expense to the building public. Their loyalty and willingness to give their time to the District service is worthy of the highest commendation and better remuneration. Unless provision be made for increased compensation, now that the force has reached its present state of efficiency, I fear, in the light of past experience, that now, being trained as they are in the work of this department and having become capable and valuable, that their services will be solicited by outside interests if their compensation is not made commensurate with the qualifications and ability necessary to satisfactorily perform the work that comes before them.

The present force of field inspectors of buildings is composed largely of new men. As these men all have had practical experience, a familiarity with the building code and zoning regulations fits them very well for the practical work of inspection.

Of the clerical force, nine in number, seven are entirely new to the work of the office. It will, I am sure, improve in efficiency and capability.

In addition to the volume of building work handled by the department during the year, a revision of the building code has been prepared. This has been a task of stupendous proportions and every channel has been explored with the view to preparing a code that will embody the best and most up-to-date standards and requirements.

It has been the practice during the year, as far as practicable, to ssue permits to build to licensed builders only. In this connection submit for the special consideration of the commissioners the sug-estion that permits to build be issued to licensed builders only vhose competency has been determined by examination before a ualified board appointed by the Commissioners of the District of olumbia. In the determination of competency full weight should e given for practical knowledge as well as technical training and xperience.

This is a matter that has recently been given consideration by the American Society of Civil Engineers. A committee appointed by the society October 18, 1922, charged with the general study of structural safety in buildings made an exhaustive study of the question and presented a report at a meeting of the society May 16, 1923, most of which is reproduced in the Engineering News Record of July 19, 1923.

Quoting from the report under the head of "Remedial proposals":

Several building reform proposals were advanced at the section meeting of October 18, 1922. The three principal ones are: (*a*) That of J. B. French, requiring that a structural engineer certify to the safety of any building of public assembly before it is opened to use; (*b*) that of R. P. Miller, restricting building permits to responsible persons registered with the city building department; and (*c*) that of L. D. Rights, making the owner legally liable in case he fails to employ a competent architect, engineer, and superintendent.

The Miller and French proposals if applied effectively would have been of value under the conditions of some of the recorded failures. In many other failures, however, they would not have made the work safe; additional changes in building methods and control would have been required. The Miller plan, a direct attempt to eliminate unfit persons from direction of building, approaches closely to effective cure of the exist'ng evils, but its weakness in failing to provide technically competent conduct of work is vital. Basing the grant of a permit on "responsibility" in place of competence is believed to be open to decisive objections. Yet the plan has the great merit of being the readiest and simplest of the remedies for building evils so far proposed. The committee believes that, however modified, it should include the French plan, which is a necessary element in building reform.

To have those engaged in the construction of buildings demon-trate their fitness for conducting a business in which the life and imb of the public is involved is believed to be a proper and necessary equirement.

As a safeguard to the health of the public, those who wish to prac-ce medicine must have a certificate from duly qualified authority efore they may legally engage in the profession. To secure a hauffeur's license, the applicant is required to pass an examination show qualifications to operate an automobile.

Under existing conditions here and everywhere in the country ermits to build are issued to anyone, regardless of competence. In nnection with the adoption of a revised building code, I believe it minently fitting that the District of Columbia should initiate this ost important step for the better protection of the life and limb of e public.

JOHN P. HEALY,
Inspector of Buildings.

ASSISTANT TO ENGINEER COMMISSIONER.

Statement of permits issued from July 1, 1922, to June 30, 1923.

	Number.	Value.		Number.	Value.
Brick:			Brick—Continued.		
Apartments	81	$12,117,500	Theaters	2	$130,000
Auditorium	1	400,000	Transformer station	1	7,000
Auto repair shops	2	75,000	Warehouses	10	608,450
Auto sales room	1	175,000	Hollow tile:		
Banks	3	288,000	Dwellings	10	109,750
Bank and office building	1	300,000	Garages	18	7,500
Cathedral addition	1	675,000	Office	1	200
Churches	12	721,500	Concrete:		
Clubhouse	1	10,000	Dwellings	24	81,300
Convent	1	50,000	Garages	37	20,300
Dwellings	1,608	14,487,600	Paint shop	1	40,000
Factories	4	112,500	Storage plant	1	60,000
Film studios	2	128,000	Store	1	1,200
Garages	606	1,549,763	Metal:		
Gasoline stations	3	9,053	Garages	2,154	491,133
Home	1	115,000	Sheds	20	12,420
Hotels	3	6,678,350	Frame:		
Manufacturing plants	4	133,870	Café	1	1,000
Market	1	59,000	Churches	2	27,500
Museum	1	994,081	Dwellings	818	4,521,550
Offices	11	2,412,025	Garages	244	84,967
Office buildings	7	602,000	Office	1	500
Office and warehouse	2	180,000	Repairs	620	242,801
Repairs	1,923	3,776,580	School	1	13,000
Schools	4	513,000	Sheds	279	70,089
Service stations	2	25,553	Machinery:		
Shops	2	10,000	Boilers	3	700
Stables	3	40,800	Elevators	110	498,149
Storage buildings	4	910,400	Motors	585	643,318
Stores	142	792,646			
Store and apartments	4	1,037,000	Total	9,416	57,638,638
Store and dwelling	8	57,500	Awnings	180	14,400
Store and flats	19	156,000	Signs	3,700	37,000
Store and office	1	50,000			
Tanks (brick base)	2	20,000	Grand total	13,296	57,690,038
Temple	1	285,000			

The following summary shows the distribution of improvements in the respective sections of the District and the values of same:

	Buildings.	Repairs, etc.
Northeast	$1,445,780	$347,904
Southeast	1,880,339	278,091
Northwest	18,496,000	3,108,487
Southwest	1,153,375	113,968
County	29,086,008	1,728,731
Total	52,061,502	5,577,136
	5,577,136	.....
Sum total[1]	57,638,638	.....

[1] Does not include awnings or signs, the values of which are estimated. Grand total for all building operations, $57,690,038.

Comparative statement for years 1922 and 1923.

	New buildings.	Repairs, etc.	Dwellings.	Apartments.	Business buildings.
1923	3,478	5,938	2,460	81	937
1922	3,510	5,323	2,397	60	1,053
Increase or decrease	32	615	63	21	116

During the year 1923 there was a decrease of 32 in the number of new buildings erected and a decrease of 116 in the number of business

buildings below the previous year, 1922. However, there was an increase of 21 in the number of apartments, an increase of 63 in the number of dwellings, and an increase of 615 in the number of repairs over the year 1922.

Valuation of building operations, including awnings and signs:	
1923	$57,690,038
1922	36,223,089
Increase	21,466,949
Permits issued, number, including awnings and signs:	
1923	12,191
1922	10,301
Increase	1,891

Estimated number of buildings in the District of Columbia.

	Brick.	Tile.	Concrete.	Stone.	Frame.
1923, erected	2,562	29	64	.....	823
1923, razed	110	.....	.....	.....	126
Total	2,452	29	64	.....	697
1922	71,646	360	212	2	28,046
Total estimated number standing	74,098	389	276	2	28,743

During this period there were issued 2,585 conforming certificates of occupancy and 118 nonconforming certificates, the fees therefor totaling $3,523.50.

REPORT OF THE INSPECTOR OF PLUMBING.

WASHINGTON, D. C., *August 13, 1923.*

SIR: I am handing you herewith the forty-first annual report of the plumbing inspection division of the engineering department.

During the last year there were 29,269 inspections on plumbing work in new buildings, 3,709 inspections of plumbing work in old buildings, and 9,489 inspections in connection with complaints made of conditions of plumbing and guttering and spouting in old buildings, making a total of 42,467 plumbing inspections made by the general field force of the office. There were also 923 inspections made of District government or United States work, and 2,155 special inspections or visits made by the head of the office, and principal assistant in connection with appeals from the District inspectors, police court cases, conferences with witnesses of illegal plumbing installation, etc., making a total of 45,545 inspections made by the office during the year. This is an increase of 3,820 inspections over the number of inspections made during the last fiscal year. The total number of inspections made by the field force, divided by the actual number of days on duty, shows that the average work was nearly 15 inspections per man per day. The largest number of inspections in any one day was 35.

OFFICE WORK.

The amount of work performed by the office force is slightly in excess of the last fiscal year, there having been accomplished a total of practically 34,600 separate and distinct operations, such as writing of letters and indorsements, preparation of notices, etc.

COMPLAINTS.

There were 9,489 complaint inspections made during the year. This comprises practically one-fourth of the inspections made by the field force and more than one-half of all of the operations of the clerical force were caused by complaints of insanitary plumbing in old houses or defective downspouts and gutters.

REGULATIONS.

During the past fiscal year there have been several minor changes made in the plumbing regulations looking to the simplification of plumbing work and to bring the language of the regulations into conformity with present practice. Only one change of real moment was made when an amendment was promulgated by the commissioners permitting the use of cast-iron or brass water supply pipe in place of lead pipe, which has proven unsatisfactory in several ways. By reason of the lesser cost of the above materials there will be a very considerable saving to the householders.

POLICE COURT CASES.

During the year nine warrants were obtained, three for violation of the plumbing regulations by householders, and six against unlicensed plumbers doing improper work. Three of these cases were disposed of by reason of compliance with the regulations; and fines were imposed in six cases. The total amount collected from fines in the six cases was $95.

COMPULSORY DRAINAGE.

During the last fiscal year 151 cases of sewer and water connections and other plumbing work were referred to this office by the health office and other divisions of the District government for prosecution under the terms of the drainage act and the nuisance act, the cost of which was to be assessed against the property. In most of these cases the required repairs were made by the agent or owner after proper notice and the work was done by this office in but 27 cases and the cost assessed. At the close of the fiscal year there were still pending in this office 16 cases which could not be immediately prosecuted by reason of legal questions, questions of ownership, etc., and there are 10 cases still under notice.

PLUMBING BOARD.

The plumbing board held 24 meetings and examined 72 applicants, of which 16 passed and were granted license, so that at the close of the fiscal year there were 249 registered master plumbers in the

istrict, about 207 of them being actively engaged in business; there ere also 8 registered gasfitters.

PUBLIC CONVENIENCE STATIONS.

There were in operation throughout the year four convenience tations, open from 6 a. m. until midnight, with two shifts of atendants, each working 9 hours per day. The largest station, that t Seventh Street and Pennsylvania Avenue NW., accommodated ,383,040 persons; that at Thirteen and a half Street and Pennsylania Avenue NW., 2,722,100; that at Ninth and K Streets NW., ,992,000; and that at Fifteenth and M Streets NE., 331,900, making total patronage of about twelve and one-half million. The cash eceipts for the year amounted to $8,441.12 and consisted of 5 cent ees received for use of pay toilets, rental of clean towels at 2 cents ach, commissions received on telephone service, bootblack stands, tc., being about 40 per cent of the actual cost of operation of the tations.

The need for new stations is being continually pointed out, and it s recommended that an effort be made to add to the number of tations in the business section.

A. R. McGonegal,
Inspector of Plumbing.

The Inspector of Buildings.

REPORT OF INSPECTOR OF STEAM BOILERS.

Washington, D. C., *August 7, 1923.*

Sir: I have the honor to submit the following lists of steam boilers nspected, fees received, and expenses incurred for the fiscal year endng June 30, 1923:

oilers inspected	460
oilers inspected for District of Columbia, no fee	35
oilers condemned as unfit for further use	6
ases of scale and deposit	86
ases of defective steam gauges	4
ases of defective tubes	56
ases of pressure reduced	7
otal amount received	$2,300
otal amount expended	325
Compensation of inspector	1,975

E. F. Vermillion,
Inspector of Steam Boilers.

The Inspector of Buildings.

REPORT OF THE PERMIT CLERK, ENGINEER DEPARTMENT.

WASHINGTON, D. C., *August 1, 1923.*

SIR: I have the honor to submit the following report of the permit clerk's office, giving the number of permits issued during the fiscal year ended June 30, 1923:

Water connections	2,992
Repairs	692
Specials (no fee)	97
Sewer connections	3,041
Repairs	758
Specials (no fees)	974
Gas mains and connections	3,140
Repairs	241
Specials (no fee)	24
Electric construction, underground connections	3,264
Repairs	33
Conduits	593
Manholes	274
Air pipe lines and private conduits	9
Fences to inclose parkings	333
Guard stones in alleys	15
Pave parkings	65
Poles, erect, replace, and remove	1,217
Miscellaneous	25
	17,787
Permits for work of various kinds in public space	5,397
Total permits issued	23,184

Fees of $1 were paid for 16,692 permits; permits for which no fees were paid, 6,492.

Record cards were made of all files referred to this office, permits issued, or reports made, and files returned to the divisions having supervision of inspections of work for which permits were issued.

Applications were filed according to location, and report of excavations in public space were made to the engineer of highways for necessary repairs.

H. M. WOODWARD,
Permit Clerk.

The INSPECTOR OF BUILDINGS.

REPORT OF ASSISTANT ENGINEER COMMISSIONER WOOD.

WASHINGTON, D. C., *September 7, 1923.*

SIR: I have the honor to transmit herewith the annual reports of operations of the various divisions and offices under my immediate supervision for the fiscal year ended June 30, 1923.

During the year a committee on the street lighting needs of the District of Columbia was appointed, and its report is designated as file E. D. 175992–2. The committee was made up of properly qualified technical men representing various fields interested in street lighting. The report includes a comprehensive survey of thoroughfares in the District of Columbia and establishes a standard of lighting for each respective street. The lighting as approved should be put into execution as soon as the necessary funds can be secured by appropriations.

During the year the office of the municipal architect has secured a comprehensive plan for the ultimate development of the penal reservation at Occoquan and Lorton, Va. This marks an important step in the realization that the District of Columbia has many reservations of considerable acreage each, for which no complete plans of development have yet been prepared. Within the next fiscal year the office proposes to inaugurate great plans for the proposed Home for the Feeble-minded near Laurel, Md., the Home for the Aged and Infirm at Blue Plains, D. C., and the grounds of Gallinger Hospital as required by modification. There yet remains the grounds of other District institutions which should be considered in group relation. This work has too long been neglected. Steps should be taken in the future to prevent the construction of any building without a study of its relation to future buildings.

A suggestion for the wharf treatment of the Washington Channel, supplemented by drawings, was prepared in February, 1923, and is designated as file E. D. 167769/4. The proposed development contemplates a two-level quay system, in which a unique recognition of Washington's national aspect is the basic thought. In its present form the plan is sufficient to indicate the nature of the treament, yet plastic enough to be susceptible of such modification as mature study by properly qualified experts may require. It is the only tangible plan in existence and should be given a definite identity in so far as its general characteristics are concerned.

There is an obvious need for more use of the particular talents of the municipal architect's office in the study of distribution centers in the District of Columbia. Certain traffic conditions can be simplified and even completely solved by design. Notable examples are the approaches of the new Key Bridge, and the eight-point intersection of Maryland Avenue at Bladensburg Road NE. Suggestive sketches of these projects have been prepared in the municipal architect's office, but are not of sufficient professional merit to be considered finished. Such general studies will require the services of technical specialists of a nature not heretofore in the employ of the District government, and for the employment of whom a special appropriation should be sought.

The office of the municipal architect is to be commended for its studies in local planning which have been prepared. This work should be carried on to the end that worthy projects may be prepared for proper presentation. In this category I would mention specifically the need of a careful survey for better traffic routing, and the improvement in appearance of traffic routes entering the city, both rail and highway.

The superintendent of the water department has continually sought to eliminate the wastage of filtered Potomac water. It is now proposed to require that all filtered water used by District and Federal functions be carefully metered, and charges made therefor at the legal rates; and that all revenues accruing therefrom be paid into the Treasury of the United States. This will provide a precise and effective surveillance of water consumption, and an accompanying remedy.

The installation of a high-pressure fire-protective service in the congested fire district is one for the almost exclusive benefit of com-

mercial and governmental interests. It should be so recognized, and financed by general appropriations. In no sense could receipts from private-water revenues be considered available for this obvious public benefit.

J. E. WOOD,
Captain, Corps of Engineers, United States Army,
Assistant to Engineer Commissioner.

The ENGINEER COMMISSIONER.

REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, D. C., *September 1, 1923.*

SIR: I have the honor to submit the following report of the operations of the electrical department for the fiscal year ended June 30, 1923.

STREET LIGHTING.

The street-lighting system, at the beginning of the fiscal year, consisted of 11,135 gas lamps and 9,573 electric lamps (783 arc, 8,790 incandescent); on June 30, 1923, there were 11,316 gas and 9,940 electric (787 arc and 9,153 incandescent), an increase of 181 gas, 4 arcs, 363 incandescents (367 electric), a total of 548 lamps of all kinds, compared with 366 in 1922. Of the 655 lamps newly connected (gross) 437, or fully two-thirds, were either "designation" lamps or the lowest powered gas or electric. The increase in aggregate candlepower of the street-lighting system is from approximately 1,752,100 to approximately 1,842,400, about 5.2 per cent. The increase of provision has been less than the increase of need, due to newly developed areas and increase of traffic. The necessity of a much higher standard of street lighting throughout the District, in the interest of safety and convenience of both drivers and pedestrians, is more and more evident. Plans and studies, both as to details of equipment and on comprehensive plan of treatment, have progressed; small temporary experimental installations have been made and studied; a representative committee on lighting needs, appointed by the commissioners, has in preparation plans, designs, map and estimates for a comprehensive project of street lighting suitable for the Capital City. The committee will, without doubt, make specific recommendations, including that funds be sought to execute the project in a term of years, not exceeding five.

ARC LIGHTING.

There has been an increase of 4 in the 4-ampere magnetite arc lamps, to a total of 787 arc lamps connected June 30, 1923. Two of these were added on M Street NW., between Thirty-fourth and Thirty-fifth Streets, to improve the situation at north approach to new Francis Scott Key Bridge and two on south side of B Street NW., between Seventh and Ninth Streets, to relieve an especially bad condition.

INCANDESCENT ELECTRIC LIGHTING.

The number of incandescent lamps added (other than designation amps) is 356, discontinued 20, a net increase of 336, being 177 of 60 andlepower, 27 of 100, 79 of 250, 2 of 400, and 51 of 600 candlepower. he transfer to this department at the beginning of the fiscal year of he roadway lighting of the Highway Bridge across the Potomac River and its approaches added to the system forty-seven 600, four 50, and seven 100 candlepower lamps and the transfer of two of the slands of safety in Union Station Plaza added four 600-candlepower amps; an improvement on East Capitol Street, Thirteenth to Eighteenth Streets, at and near the New Eastern High School, added two 00, nine 250, and twenty-six 100 candlepower lamps in replacement f gas lamps; thirty-nine 250-candlepower lamps were added, replacing gas, in Seventeenth Street NW. and in Fifteenth Street NW., etween K Street and Massachusetts Avenue; thirteen 250-candlepower lamps were added in an experimental equipment in Rhode sland Avenue NW., between Seventh and Ninth Streets; eight 100-andlepower lamps were added, replacing 60 candlepower, at intersections of Georgia Avenue NW., Harvard to Newton Streets; wenty-nine 60-candlepower lamps were added in Takoma Park section; ten 60-candlepower lamps were added, in special fixtures, for raffic warning, at five railway viaducts crossing streets; the remainer of the additions were individual or in lots of six or less, widely cattered.

The total number of electric incandescents connected June 30, 1923, as 8,942, compared with 8,606 at the close of the preceding year.

MANTLE GAS LIGHTING.

The number of mantle gas lamps added was 263, discontinued 86, net increase of 177. The total mantle gas lamps connected June 0, 1923, was 10,911 (10,759 60-candlepower, 152 120-candlepower) ompared with 10,734 (10,617 60-candlepower, 117 120-candlepower) t the close of the preceding year. The additions were individual r in lots of six or less, widely scattered. It is the present intention o replace gas lighting by electric lighting as early and as rapidly as racticable and extensions of gas lighting are made only to meet ressing needs.

DESIGNATION LAMPS.

The number of designation lamps added was 32, 5 gas and 27 electric, and the number discontinued was 1 gas, a net increase of 31; he 1 lamp discontinued was replaced by electric. Of the designation amps added, 4 were traffic warning lamps at isles of safety, F Street W., east of Fourteenth, the remainder fire-alarm-box designation, idely scattered. The total of designation lamps connected June 30, 923, was 616 (405 gas, 211 electric), as compared with 585 (401 gas, 84 electric) at the close of the preceding year.

LIGHTING ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against certain railroad companies for repayment or sums expended for the lighting of streets, avenues, etc., adjacent

to their several rights of way, remains as reported for the past three years. The new trial of typical case in the lower court, necessitated by ruling of the court of appeals, has not been reached. The sum to be added in claim by the operation of the fiscal year is $9,387.04.

SIGNAL SYSTEM.

The fire-alarm telegraph, the police-patrol signal, and the telephone systems have been operated and maintained and each has expanded slightly in the line of natural growth.

Fire-alarm boxes added to the system number 45 (34 public, 11 private), and 2 private boxes were discontinued, a net increase of 43, to a total in service June 30, 1923, of 782 (615 public, 167 private). Boxes connected by underground wires were increased by 37 to a total of 663, including 582 on street posts, and boxes connected by overhead wires increased by 6 to a total of 119.

Among the most important of the recommendations concluding the report of the committee on fire prevention in the city of Washington, dated July 1916, was that additional boxes be installed to secure a certain standard of distribution. While the net increase in this past year of 34 public boxes compares with an average increase in public boxes of 18$\frac{3}{7}$ for the seven years since the date of that report, the phenomenal expansion of suburban development leaves the situation no better than in 1916. Increased appropriations permitting an increase of public fire-alarm boxes by not less than 50 per year until the approved standard of distribution is reached, and then of sufficient to maintain that standard, are earnestly recommended as necessary provisions of security.

The switchboard and instruments for enlarging the fire-alarm headquarters apparatus, provided for in appropriation of the preceding year and previously reported as received and partly installed and connected, has progressed to the utilization of 5 of the 10 additional box circuits thus made possible as to headquarters equipment; this relieves what were the most seriously overloaded circuits, but the desirable further redistribution of circuits has been impossible with the restricted provision for distribution and materials and construction costs.

Careful inspection, maintenance and repair service on the apparatus has been maintained.

The number of fire alarms received and transmitted through fire-alarm headquarters was 2,826, compared with 2,033, 1,795, 1,815, and 2,248 in the next four preceding years; this includes 34 "additional" alarms (19 second, 10 third, and 5 fourth), compared with 36 (18 second, 9 third, 5 fourth, and 4 fifth), in the next preceding year. False alarms numbered 210, compared with 181 and 145 in next two preceding years, the false box alarms being under 13 per cent of the total regular box alarms, as compared with above 14 per cent in the next preceding year. The number of regular box alarms was 44 per cent of the total of box and local (exclusive of "additional") alarms, compared with nearly 50 per cent in the next preceding year.

The number of police-patrol boxes added was 3 (1 connected underground and 2 overhead), a net increase of 3, compared with 12

in the next preceding year, making the total connected June 30, 1923, 490; of these, 385 are connected on underground and 105 on overhead wires.

As distinguished from the fire-alarm boxes, which are on circuits centering at headquarters in the District Building, the police-patrol boxes are on circuits centering at the respective police-precinct stations, of which there are 12 in 11 precincts, the seventh precinct having a substation at Tenleytown. Up to 1910 each police-patrol box contained an electromechanical signaling instrument, similar to a messenger-call box, and a telephone, and the boxes were connected "bridged" or in multiple, several on a circuit. In that year the patrol boxes of the first precinct were modernized by the elimination of the call-box mechanism and by connecting each box with telephone only, on separate circuit. This change proved to be such an improvement and such an advantage in police administration that the police and electrical departments joined in the next year in urging the immediate similar modernizing of the entire police-patrol system. Funds were provided such that the system centering at one station was so modernized in each of the years 1912, 1913, 1914, 1915, 1916, 1918, and 1921—that is, five in the first five years and two in the past seven years—the ninth, tenth, and eleventh precincts and the substation of the seventh precinct still remaining in the obsolete class. The institution of twelfth precinct and the rearrangement of the patrol boxes in its territory made up of a portion of each the ninth and tenth, both provided for, will effect the modernizing of the boxes to be included in the new precinct.

Estimates have been submitted on the modernizing of the remainder of the system, and provision for completion of this long-needed improvement is urged. The police department is now urging the installation of further steps of modern practice, of undoubted value, which are not practicable until the other step has been taken.

The number of telephones added, connected to the two private branch exchange switchboards in the jurisdiction of this department, the main District of Columbia P. B. X. Main 6000, and the fire-alarm headquarters P. B. X. Main 20, was 26, and 11 were discontinued; a net increase of 15, compared with 21 for the year next preceding.

Connected to other District P. B. X. switchboards, which are tie line connected to Main 6000 switchboard, additions were made as follows: Police department, 9 added, 4 discontinued, net added, 5; water department, 1; Public Library, 2; and of schools, Dunbar High, 1; McKinley Manual Training, 2; Miner Normal, 1; Franklin, 1; also new installations of P. B. X. switchboards, tie connected to Main 6000, Tuberculosis Hospital with 8 and New Eastern High School with 50 telephones; also an addition of 7 in the police-patrol service. The number of telephones on the District of Columbia system was thus increased by 97 (compared with 26 in the next preceding year) to a total connected June 30, 1923, of 1,550.

The number of cells of storage battery in service on fire alarm, police patrol, and local circuits remains unchanged at 2,174.

The distribution equipment for the composite-signals system (fire alarm, police patrol, and telephone) has been affected by the installation of approximately 8 miles of underground cables containing approximately 449 miles of conductors, the withdrawal of approximately one-half mile of underground cable, of approximately 6½

miles of conductor, and the installation of approximately one-fourth mile of aerial cable containing approximately 3½ miles of conductor, a net increase of approximately 7¾ miles cable, 446 miles conductor. Grand total of composite distribution in service June 30, 1923, 179.004 miles of cable, containing 7,081.047 miles of conductor.

This distribution system is inadequate to meet the demands of the services and in parts is in precarious condition, threatening continuity of important communications service.

Further consideration of utilizing radio communication has been deferred.

POLES AND OVERHEAD WIRES.

The regulation of the erection of poles, of the stringing of overhead wires, and of the maintenance of same in safe condition in the streets and other public spaces has been carried on. The operations of the public utility companies have resulted in an aggregate net increase during the year of 1,045 poles (922 line and 123 guy), bringing the record total of all electric poles on June 30, 1923, to 21,959 (20,612 line, 1,347 guy). The list of pole owners comprises the United States, the District of Columbia, and 17 companies (the steam railroads being lumped as one); more than 77 per cent of the poles are owned by, and practically all of the year's increase is by, two of the companies; the United States owns 298 and the District of Columbia 479, a combined Government ownership of about 3½ per cent of the total; the only change in Government ownership in the year is the taking down of 6 line poles by the District of Columbia. The increase of total, 1,045, compares with 912 and 348 of the next two preceding years, it being a second year of exceptional activity due principally to exceptional suburban development; the number of telephone poles in streets and avenues within "the prescribed area" of the act of Congress regulating the use of telephone wires in the District of Columbia, approved June 30, 1902, has not been changed. The policy of favoring and sometimes inducing joint use of poles has been continued and has resulted in materially retarding the increase in number of poles.

ELECTRIC INSPECTION—WIRES AND APPARATUS.

In the operations under the act of Congress to regulate electrical wiring in the District of Columbia, approved April 26, 1904, and the regulations thereunder:

The total number of permits issued in connection with the installation of wires and apparatus on private property was 9,791, compared with 8,029 and 6,217 in the next two preceding years.

Fees paid to the collector of taxes, $16,164, compared with $13,861 and $11,626.

Number of inspections recorded, 22,817, compared with 17,284 and 16,170.

Reference is made to the reports of the past several years in the matter of need of increased personnel for this service and the statements and recommendations therein again repeated. The situation was very bad three years ago and has grown much worse each year.

MISCELLANEOUS WORK.

The service of this department in cooperation with the municipal architect and for other District departments or divisions, in consulting and counseling, in preparing plans and specifications for and in supervision of electrical work, has been exceptional; plans and specifications were prepared, are being prepared, and the introduction of electrical work has been supervised where started in municipal properties: 1 high school, 3 junior high schools, 12 grade schools, 2 correctional institutions, 1 hospital, 4 police stations, 1 fire-engine house, and 1 wharf.

I wish to record my appreciation of the work done by the employees of this department.

WARREN B. HADLEY,
Electrical Engineer, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Fire alarms received and transmitted.

Regular box alarms	1,227
Alarms received from telephone stations	5
Local alarms	1,560
Second alarms	19
Third alarms	10
Fourth alarms	5
Total	2,826
False alarms:	
Box	156
Local	54

Lamps of all kinds in service June 30, 1923, as compared with June 30, 1922.

Kind of lamp.	1922	1923
Mantle gas, single burner	10,617	10,759
Mantle gas, double burner	117	152
Electric arc:		
6.6-ampere magnetite	283	283
4-ampere magnetite	500	504
Electric incandescent:		
600-candlepower, series	.....	51
400-candlepower, series	.....	2
250-candlepower, series	89	168
200-candlepower, multiple	64	64
100-candlepower, series	4,060	4,087
100-candlepower, multiple	98	98
60-candlepower, series	4,021	4,179
60-candlepower, multiple	274	293
Street designation:		
Gas	401	405
Electric	184	211
Total	20,708	21,256

Net increase during year, 548 lamps.

Distribution of police patrol boxes June 30, 1923.

Precinct.	Wall boxes.		Booths.		Total
	Underground.	Overhead.	Underground.	Overhead.	
First	38				38
Second	28				28
Third	50				50
Fourth	37	2			39
Fifth	44	2			46
Sixth	29				29
Seventh	23	4			27
Eighth	29				29
Ninth	38	23		1	62
Tenth	52	11	2	2	67
Eleventh	4	35		1	40
Subprecinct, Tennallytown	11	22		2	35
Total	[1] 383	99	2	6	490

[1] Thirteen of these boxes at following locations are not on posts: 3, Union Station; 1, engineer stables; 1, Takoma Park, watch box; 1, Treasury Department; 1, Agricultural Department; 1, Department of Justice; 1, Pan American Union Building; 1, Walter Reed Hospital, information bureau; 3, in special booths erected by the police department at Fourteenth and Kennedy Streets NW.; Twenty-second Street and Rhode Island Avenue NE.; and Connecticut Avenue and McKinley Street NW.

Telephones connected to the District system June 30, 1923.

Offices of the District Building	205
Outside offices and institutions	115
Residences	4
Public schools	252
Fire department	59
Police department, private branch exchange	70
Water department, private branch exchange	45
Franklin School, private branch exchange	44
Western High School, private branch exchange	18
McKinley Manual Training School, private branch exchange	20
James Ormond Wilson Normal School, private branch exchange	30
Miner Normal School, private branch exchange	14
New Central High School, private branch exchange	36
Dunbar High School, private branch exchange	23
Eastern High School, private branch exchange	50
Public Library, private branch exchange	24
Washington Asylum and Jail, private branch exchange	25
District repair shop, private branch exchange	6
House of detention, private branch exchange	8
Tuberculosis Hospital, private branch exchange	8
Police patrol service	494
Total	1,550

There are also 28 portable telephone sets in service, the property of the District of Columbia, used by the fire department and the electrical department.

Signals distribution system.

	Cables.	Conductor.	Cables.	Conductor.
Undergound:	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Installed, 1923	7.877	449.240		
Withdrawn, 1923	.441	6.720		
In service June 30, 1923			172.976	6,902.899
Aerial:				
Installed, 1923	.227	3.636		
In service, June 30, 1923			6.068	178.448
Total			179.044	7,081.047

ELECTRIC INSPECTION—WIRES AND APPARATUS.

The following tables show the amount of work performed by this department in connection with electric wiring inspections:

Notices received from the inspector of buildings of permits indicating electric wiring:	
Building	3,503
Machinery	372
Signs	176
Total	4,051
Permits issued by the electrical department for installations:	
Without fee (ordered by District of Columbia, etc.)	98
Covered by building permits	3,716
Not covered by building permit	5,817
For temporary work	126
Quarterly (maintenance of plants, etc.)	34
Total	9,791
For temporary use of current	518
Total	10,309
Certificates issued:	
Final (including six without fee)	6,451

	Number.	Approximate kilowatts.
Lamps and apparatus installed:		
Lamps, incandescent	193,671	7,746
Motors	546	1,157
Devices, miscellaneous	1,054	368
Blank outlets	34	.....
Subtotal	195,305	9,271
Transformers	11	743
Total	195,316	10,014

Defective wiring discovered and reported, extra of routine inspection work	239
Number of notices of defective wiring sent	2,050
Requests for inspection (not related to work already under permit)	6
Miscellaneous jackets (specifications, etc., for District of Columbia work, etc.)	656
Notices received from the superintendent of licenses, leading to original inspection or periodic (annual) reinspection of theaters, hotels, assembly halls, etc	170
Work of inspectors of electric wiring from July 1, 1922, to June 30, 1923:	
Inspections in private buildings (not including theaters and moving-picture theaters)	21,648
Inspections in municipal buildings	527
Inspections in United States Government buildings	10
Inspection in theaters (including moving-picture theaters) including reinspections, periodic (annual), and occasional, in moving-picture theaters (more frequent periodic inspections being made by the fire marshal), and periodic reinspections (weekly or more frequently, if bill changes) of theaters	632
	22,817
Fees paid to the collector of taxes:	
For permits	$16,164

MISCELLANEOUS WORK.

This department made plans and specifications for and supervised the introduction of electric work (where started) in the following municipal properties:

Completed:
- New Eastern High School, lighting, power, telephones, clocks and bells, laboratory equipment, and lighting fixtures.
- Monroe School addition, lighting and power.
- Eaton School addition, lighting and power.
- Wheatley School addition, lighting and power.
- Buchanan School addition, lighting and power.
- Kingsman (Lincoln Park School), lighting and power.
- Bell School, lighting and power.
- Psychopathic group, Gallinger Municipal Hospital, lighting fixtures.
- Temporary electric-generating plant, Gallinger Municipal Hospital.
- Wharf No. 6, lighting.
- Industrial Home School, lighting and power.
- New electric generator, workhouse, Occoquan, Va.
- No. 2 precinct police station cell corridors, lighting.
- Power plant, Gallinger Municipal Hospital, lighting.

Under construction:
- Macfarland Junior High School, lighting, power, telephones, clocks, and bells.
- Langley Junior High School, lighting, power, telephones, clocks, and bells.
- Smothers School, lighting, power, and telephones.
- Shaw Junior High School, clock and bell system.
- Nurses' home, Gallinger Municipal Hospital, lighting fixtures.

This department prepared plans and specifications in the office of the municipal architect, District of Columbia, and supervised the introduction of electric work (where started) in the following municipal properties:

Under construction:
- Henderson School, lighting, power, and telephones.
- Garrison School, lighting, power, and telephones.
- Lovejoy School addition, lighting, power, and telephones.
- Chain Bridge School, lighting, power, and telephones.
- Strong John Thomson School addition, lighting, power, and telephones.
- Head house, wharf No. 6, lighting, power, and telephones.
- No. 12 precinct police station, lighting, power, and telephones.

Prepared but not started:
- Cottage for colored children, Blue Plains, lighting.
- No. 7 precinct police station cell corridor, lighting.
- No. 9 precinct police station cell corridor, lighting.
- No. 16 fire-engine house, lighting, power, and telephones.

REPORT OF THE MUNICIPAL ARCHITECT.

WASHINGTON, D. C., *September 29, 1923.*

SIR: I have the honor to submit herewith the fourteenth annual report of the office of the municipal architect for the fiscal year ended June 30, 1923.

The work in the municipal architect's office consists of the preparation of plans, specifications, and superintending the construction of all buildings built by the District of Columbia, consisting chiefly of schools, fire-engine houses, and police stations built for the city departments, and, in addition, the preparation of drawings and estimates for new buildings and repairs to existing buildings for the

various municipal institutions, such as the Home for the Aged and Infirm at Blue Plains, the Girls' Reformatory School, National Training School for Boys, and other similar institutions.

The repair shop, which is an adjunct to the municipal architect's office, is charged with the upkeep and repair work of the various buildings of the school system as well as other municipal institutions. A separate report of this department is inclosed herewith.

The development of plans and the construction of buildings at the reformatory and workhouse at Lorton also comes under this office, and the report of the engineer in charge is inclosed herewith.

SCHOOLS.

At the beginning of the fiscal year the following buildings were under construction:

Four-room addition to the Monroe School.
Four-room addition to the Deanwood School.
Twelve-room addition to the Wheatley School.
Eight-room addition to the John Eaton School.
Eight-room addition to the Lucretia Mott School.
Eight-room building known as the Richard Kingman School.
Eight-room addition to the Buchanan School.
Eight-room building to replace the Bell School.
Eastern High School.

The above buildings, with one or two exceptions, were finished on time, ready for the beginning of school, and were furnished and taken over by the school board.

NEW WORK.

School building to replace the Smothers School, located between Forty-fourth, Forty-fifth, Clay, and Brooks Streets NE. By the act of June 16, 1921, $70,000 was appropriated for the erection of a four-room building. Advertisement for bids for the construction of this building was made November 10, 1921, but the bids were rejected, as they exceeded the amount of the appropriation. Contract was executed March 2, 1923, with David J. Phipps in the sum of $73,538. Expiration of contract time, September 5, 1923. The work was completed September 22, 1923. Cost to date, $74,404.50. The direct system of heating and ventilating will be installed, but it will eventually be changed to the split system. Cubic contents, 207,640 cubic feet. Cost per cubic foot, 45.3 cents.

Addition to the Lovejoy School, located at Twelfth and D Streets NE. By the act of June 29, 1922, $125,000 was appropriated for the erection of an eight-room addition. Contract was executed March 16, 1923, with the Schneider-Spliedt Co., for the construction of the addition, including plumbing, electrical, heating, and ventilating work, in the sum of $115,900. Expiration of contract time, September 27, 1923. It is expected that the work will be completed about October 16, 1923. Cost to date, $121,634. The split system of heating and ventilating will be used in this building. Cubic contents, 306,510 cubic feet. Cost per cubic foot, 37.81 cents.

Addition to the Garrison School, located on Twelfth Street, between R and S Streets NW. By the act of Congress of June 29,

1922, $140,000 was appropriated for the erection of an eight-room addition. Contract was executed April 17, 1923, with George E. Wyne, for the construction of the addition, including plumbing, electrical, heating, and ventilating work, in the sum of $136,350. Expiration of contract time, November 30, 1923. It is expected that the work will be completed about November 30, 1923. Cost to date, $136,604.64. The direct-indirect system of heating and ventilating will be used in this building. Cubic contents, 328,470 cubic feet. Cost per cubic foot, 41.51 cents.

Bancroft School, located at Eighteenth and Newton Streets NW., in Ingleside section. By the act of June 29, 1922, $140,000 was appropriated for the erection of an eight-room extensible building. Contract was executed May 11, 1923, with George E. Wyne, for the construction of the building, including mechanical equipment, in the sum of $139,300. Expiration of contract time, January 11, 1924. It is expected that the work will be completed January 11, 1924. The direct-indirect system of heating and ventilating will be used in this building. Cubic contents, 330,349 cubic feet. Cost per cubic foot, 42.17 cents.

Langley Junior High School, located on T Street between First and Second Streets NE. The appropriation act of June 16, 1921, authorized the commissioners to enter into contract for this building at a cost not to exceed $300,000, and appropriated $100,000 for the beginning of the erection. An additional $200,000 was appropriated by the act of June 29, 1922. Contract was executed January 23, 1923, for building, including plumbing, electrical, and mechanical equipment, in the sum of $293,250, with M. Seretto. Expiration September 22, 1923. It is expected that the work will be completed about November 1, 1923. Cost to date, $293,305.50. The split system of heating and ventilating is to be used in this building. Cubic contents, 1,006,792 cubic feet. Cost per cubic foot, 29.13 cents.

Macfarland Junior High School, located on Iowa Avenue between Upshur and Allison Streets NW. The appropriation act of June 16, 1921, authorized the commissioners to enter into contract for this building at a cost not to exceed $300,000 and appropriated $100,000 for the beginning of the erection. An additional $200,000 was appropriated by the act of June 29, 1922. Contract was executed January 23, 1923, for building, including plumbing, electrical and mechanical equipment in the sum of $293,250, with M. Seretto. Expiration, September 22, 1923. It is expected that the work will be completed about October 15, 1923. Cost to date, $291,055. The split system of heating and ventilating is to be used in this building. Cubic contents, 1,006,792 cubic feet. Cost per cubic foot, 29.13 cents.

Chain Bridge Road School, located on Chain Bridge Road between Garfield and Fulton Streets NW. By the act of June 29, 1922, $25,000 was appropriated for the erection of a 2-room building to replace the present 1-room school building. Contract was executed June 12, 1923, with Ennis & Hare for the construction of this building, in the sum of $23,625. Expiration of contract time, October 12, 1923. It expected that the work will be completed about October 12, 1923. Cost to date, $23,625. The direct system of steam heating

will be used in this building. Cubic contents, 59,672 cubic feet. Cost per cubic foot, 39.59 cents.

Head house on Wharf No. 6, located on Water Street between M and N Streets NW. By the act of March 3, 1917, $53,000 was appropriated for the improvement of Wharf No. 6. One of the improvements provided for was the construction of a head house. Advertisement was made and bids were received December 18, 1922, for the construction of the head house, but the bids exceeded the amount remaining in the appropriation. Advertisement for bids was made on revised plans and bids were received May 1, 1923. The bid of Ennis & Hare was accepted and contract entered into with said firm June 12, 1923, in the sum of $9,905. Expiration of contract time, October 12, 1923. It is expected that the work will be completed about October 1, 1923. Cost to date, $9,905.

Police precinct station No. 12, located at Seventeenth Street and Rhode Island Avenue NE. By the act of March 3, 1917, $40,000 was appropriated for the erection of this station house. By the act of June 29, 1922, an additional $20,000 was appropriated for the purpose. Contract was executed June 15, 1923, with the G. G. Loehler Co., for the construction of this station house, including mechanical equipment, in the sum of $55,376. Expiration of contract time, November 15, 1923. It is expected that the work will be completed about December 1, 1923. Cost to date, $55,662.68. The direct system of steam heating will be employed in the building, and the direct-indirect system in the cells. Cubic contents, 163,200 cubic feet. Cost per cubic foot, 33.93 cents.

Police precinct station No. 7, located on Volta Place between Thirty-third Street and Wisconsin Avenue NW. Contract was executed June 29, 1923, with the G. G. Loehler Co., for making alterations in this station house, in the sum of $7,380. Expiration of contract time, October 29, 1923. It is expected that the work will be completed about October 29, 1923. Cost to date within the contract price.

Police precinct station No. 9, located on Ninth Street between E and F Streets NE. Contract was executed June 29, 1923, with the G. G. Loehler Co., for making alterations in this station house, in the sum of $7,213. Expiration of contract time, October 29, 1923. It is expected that the work will be completed about October 29, 1923. Cost to date is within the contract price.

Besides the preparation of plans and specifications for the above buildings, plans and specifications for about 40 other pieces of work, such as heating systems in engine houses, police stations, and school buildings, etc., were prepared in this office, the contract prices therefor amounting to $63,458.

The contracts entered into by this office for the fiscal year beginning July 1, 1922, and ending June 30, 1923, amounted to a total of $1,498,377.

New Eastern High School, located on East Capitol Street between Seventeenth and Nineteenth Streets NE. Contractual limit for building, $1,500,000. Appropriations have been made as follows: A balance of $28,448.65 from the appropriation for purchase of site made available toward construction of building; $300,000 appropriated by act of March 3, 1917; $60,000 by act of June 5, 1920; $240,000 by act

of February 22, 1921; $900,000 by act of June 29, 1922; and $250,000 for equipment by deficiency act of July 1, 1922.

Contract was executed September 10, 1920, for work of making excavations for building; work completed January 29, 1921, at a cost of $41,011; contractor, George Hyman. Contract was executed January 28, 1921, with George Hyman for the construction of foundations and substructure; work was completed November 15, 1921, at a cost of $292,270. Contract was executed with George E. Wyne November 9, 1921, for the construction of the superstructure; the work was completed December 9, 1922, at a cost of $950,318. Furnishing, and installing electric lighting fixtures: Contract executed January 23, 1923, with O. R. Evans & Bro.; work was completed March 29, 1923, at a cost of $9,386. Grading of site: Contract executed January 30, 1923, with Latimer & Maloney; work was completed April 7, 1923, at a cost of $16,740. Stage lighting equipment: Contract executed with O. R. Evans & Bro. January 30, 1923; work completed March 22, 1923, at a cost of $3,764. In addition contracts have been executed and orders issued for the equipment for the building to the extent of $250,000. The split system of heating and ventilating is used in this building. Cubic contents, 4,828,900 cubic feet. Cost per cubic foot, 26 cents.

INCREASE IN COST OF BUILDINGS.

The cost of buildings, as indicated by the proposals received during the past year, has shown a steady increase, and it has been with great difficulty that buildings of the present appropriation bill have been put under contract. The last building on which bids were received was an eight-room extensible school at the intersection of Rock Creek Church Road and Spring Road. For this building I adapted plans that were used for the Bell School to the new site. The building for the Bell School was put under contract on May 19, 1922, for $119,345, or about 38 cents per cubic foot. The lowest bid received on the new school was $147,000, or an increase of $27,655, making the price per cubic foot 47 cents. As the bids were based on identical buildings it is manifest that the increase was due entirely to higher building costs. In view of the fact that the low bid for the proposed building at the intersection of Rock Creek Church Road and Spring Road exceeded the available appropriation of $130,000 by $17,000 it was not possible to let a contract without radically revising the plans. This was considered impracticable. The bids, therefore, were rejected, and the project postponed to await better market conditions. In this connection it is interesting to note the last report of the Bureau of Statistics, in which the statement is made that the average cost of building in June, 1920, was 41.6 per cent higher than in December, 1914, and June of this year it was 81.4 per cent higher than in 1914. If this condition persists, I fear we will not be able to let contracts for the buildings carried in the present bill within the moneys appropriated.

ADDITIONS TO OLD BUILDINGS.

I wish to call attention to the very unsatisfactory method of obtaining appropriations for additions to existing schools, for which we are frequently called upon to prepare plans. Most of the older

eight-room buildings are heated with hot-air systems, which generally comprise two furnaces in different parts of the building. Frequently an addition of four or eight rooms has been added to these buildings, which is usually heated by a separate furnace. When a third addition is required, generally eight rooms, we have the problem of heating the new unit, which, if an independent plant is installed, makes four separate heating plants, and places a great burden on the janitor or janitors having to maintain so many independent heating units. Generally the appropriation is specific in that it covers only the new addition to the building and rarely carries anything for the installation of a central heating plant for the whole group. The auditor has ruled against using any of the appropriation for the new building for remodeling or replacing the heating systems of the old buildings. Manifestly, the above situation is intolerable, as the four independent plants are uneconomical from the standpoint of first cost and also maintenance. Further, many of the old plants should be replaced, and this can best be done by combining the heating units into one plant when an important change is made in the building. The appropriations for this type of building should cover a specific amount for the new unit and a separate amount for the remodeling of the old buildings and the installation of a modern heating plant for the entire group.

SCHOOL GROUNDS.

In connection with the purchase of properties for new school buildings, I wish to call attention to the wholly inadequate sites generally provided. It is deplorable that most of our public schools do not have sufficient ground for play space, nor are the buildings provided with proper landscape settings. In fact, most of the schools have little more than the public parking, which, with the very limited playground space, makes it impossible to properly control the children and prevent them from playing in the parking spaces in front of the school. The result of this is generally a very disreputable looking approach to the school. If adequate playground space be furnished at the rear or sides of the schools, and it were possible to set the building well back from the building line, much more attractive approaches could be designed. I believe the opportunity for flowers, shrubbery, and other attractive planting would stimulate among both teachers and pupils an effort to maintain more beautiful surroundings than exist at the present time. I can not imagine anything more attractive in the midst of a thickly populated district than the public school placed on a spacious lot, set among flowers, shrubbery, and green grass. The average city block is about 300 feet long. A city square, therefore, would contain about 90,000 square feet. A 16-room school with an auditorium will occupy approximately 15,000 square feet, which would leave 75,000 square feet available for play space and approaches. If we set the building back about 30 feet from the building line for parking along the entire front, we would take up 9,000 square feet, which would leave 66,000 square feet for play space, or 33,000 square feet for each of two play spaces—one for boys and one for girls. I am of the opinion, therefore, that no graded school should have a site less than one city block. High schools should have proportionately larger sites, based on the requirements of each individual case.

GALLINGER HOSPITAL.

On December 15, 1921, the psychopathic group of the Gallinger Hospital was completed, and I was instructed to prepare plans and specifications for two ward buildings of the general hospital scheme. A general plan, as also the detail working drawings for the several buildings, were prepared for a site bounded by Upshur Street, Allison Street, Fourteenth Street, and Iowa Avenue. By the act of Congress, March 3, 1917, the site was changed to the tract of land occupied by the present city hospital near the Eastern Branch. The plans of the various buildings already prepared for the first site were adjusted to the new one. In the new arrangement the domestic building was placed in the center of the grounds, obstructing a fine view of the Anacostia River and the hills beyond. A small rendered drawing was made showing the entire hospital group as planned for the new site. This plan indicated clearly the unfortunate location of the domestic building from the standpoint of landscape design. The drawing also developed other probable undesirable features in the location of the administration buildings.

The group plan was finally submitted to the Fine Arts Commission for their suggestion and criticism, and the following recommendation was made:

At the meeting of the Commission of Fine Arts on May 4, 1923, Mr. A. L. Harris, municipal architect, and Capt. John E. Wood, assistant engineer commissioner, submitted drawings for the treatment of the Gallinger Hospital grounds, on Massachusetts Avenue SE., near the Anacostia Park, and stated advice was desired particularly with reference to the location of proposed new buildings.

The architect members of the commission (two of whom have had experience in hospital building) advise that before any further building is done the plans for the Gallinger Hospital be submitted to expert medical authorities on hospital construction for advice. The plans as submitted are not in accord with modern practice as to arrangement of the buildings. The commission suggests that the plans be submitted to Dr. S. S. Goldwater, director of the Mount Sinai Hospital, New York City, who is considered by architects the most eminent authority on hospital building construction and administration.

The commission will be pleased to give the plans further consideration after expert medical report has been made to you.

CHARLES MOORE, *Chairman.*

Immediately upon the return of Doctor Goldwater from Europe I took up the proposition of obtaining his services for a general criticism of the plans already prepared. After some correspondence, a proposition was made by Doctor Goldwater to make a complete survey of the plans and report his best judgment as to the proper arrangement, sequence, and relation of the various buildings, so as to bring about the most efficient administration of the various activities included in a modern hospital. At the present time no action has been taken on my recommendation submitting Doctor Goldwater's proposition to the commissioners. In the meantime, the plans and specifications for the ward buildings have been completed and are ready to be placed on the market as soon as the matter referred to above has been determined.

REFORMATORY AND WORKHOUSE.

Considerable progress has been made on the industrial railroad at Lorton, Va.; the grading is practically completed and nearly half a mile of track has been laid. The work on the buildings for the

reformatory at Lorton has been pushed rapidly during the summer so that now five shops, two washhouses, two disciplinary wards, and one dormitory building are completed, and the foundations of two additional wards started. Plans are being made for the domestic building, which is expected to be built during the winter and ready for occupancy early next spring. The report of the engineer in charge of this work will be found in another section of this report. Considerable progress has also been made in the development of a general scheme for the new workhouse. A number of studies have been made for different sites, which have been submitted at various times to the authorities for criticism and suggestions. It is believed that a satisfactory scheme has been found and that the sketches have been sufficiently studied to assume that a definite program can be laid down and actual working drawings commenced for the men's group. No studies have been made for the women's group to date, but it is expected to study this problem in connection with the men's group, in order that they may be properly coordinated architecturally.

Preliminary studies for the Home for the Feeble Minded on the site just purchased have been made and a general program mapped out. It is believed that it is possible to work out an excellent scheme and that the buildings will be well located on the high ground overlooking the Patuxent River, leaving the comparatively level ground free for farming purposes.

REPAIR SHOP WAGES.

Since the war the repair shop has experienced great difficulty in obtaining proper mechanics for the work of the repairs and upkeep of the schools. Congress appropriated for this purpose last year $300,000, most of which is spent in the repair and remodeling of existing buildings. Because of the impossibility of getting first-class mechanics, I regret to say much of this work is not only poorly done but unskilled mechanics do irreparable damage to the surrounding work, and frequently an incompetent mechanic will ruin more surrounding work than that replaced or repaired. This is poor economy and it seems to me that it would be wiser to employ only competent mechanics who work more efficiently and more intelligently.

Complaint has been made by the superintendent of the repair shop that the salaries fixed by the wage board are not sufficient to get proper mechanics and that he is doing the best he can under the circumstances.

Recently I submitted the following recommendation:

To Captain Wood.

Forwarding herewith petitions of the men employed at the repair shop requesting a hearing before Major Bell to present their view of the wages now paid the employees in that department. As there is considerable difference in the wages paid mechanics by outside contractors and the wages paid by the District, it seems to me that some action should be taken by the District to make this scale more nearly equitable, as I believe better work can be obtained if the men are satisfied. I am of the opinion that consideration should be given to some method of establishing a sliding scale by which adjustments

can be made from time to time as the wages vary on the outside. Owing to the fact that the men in the repair shop are employed the year around, whereas outside employment is more or less irregular, the employees of the repair shop should receive less.

——— ———,
Municipal Architect, District of Columbia.

I would therefore recommend that serious consideration be given to the adoption of a sliding scale as outlined above which will maintain a reasonable relation between wages paid the repair shop and those of outside mechanics.

OFFICE OF THE MUNICIPAL ARCHITECT.

Owing to the low salary scale of the municipal architect's office, great difficulty has been experienced in maintaining competent draftsmen for the work. During the past year the total number of draftsmen employed was 26. The total number at the present time is 13. The men representing the difference practically without exception have left because of better opportunities in private architects' offices or in Federal departments. It is difficult to build up an efficient organization where the personnel never remains the same for more than a month or six weeks at a time. This changing of employees hinders the execution of the plans and specifications. In this connection I would like to call your attention again to the recommendation in my report of 1922, in which I asked that instead of being allotted a predetermined proportion of the $100,000 allotment, that a sum equivalent to 3 per cent of the total cost of each project be set aside to pay for drafting, superintendence, supplies, and other miscellaneous items of expense in connection with the preparation of plans and specifications. This would give a specific sum for each individual project and each building would bear its proportionate cost. The present systems of allotting a certain sum of money, always less than the estimates submitted, is unbusinesslike and confusing. I would therefore suggest that the system outlined above be given consideration.

ALBERT L. HARRIS,
Municipal Architect, District of Columbia.

To the ASSISTANT ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF REPAIRS.

WASHINGTON, D. C., *July 23, 1923.*

SIR:—I have the honor to forward herewith my annual report showing the operations of this shop during the fiscal year ended June 30, 1923.

There was appropriated by Congress:

Public schools, repairs to buildings, $250,000, all of which was expended except $221.90, which was reserved for any small bills that might come in after the close of the year.

Repairs to engine houses, $20,000, all of which was expended except $16.74.

Repairs to stations, $7,000, all expended except $4.30.

Repairs to police-court building, $2,000, all expended except $14.20.

The foregoing amounts represent the actual cost of 4,353 separate jobs.

In addition to the work covered by the above appropriations, which are under the supervision of the superintendent of repairs, this shop did $114,655.55 worth of work on various buildings belonging to the District of Columbia out of appropriations controlled by other departments.

We inspected and repaired steam boilers in 100 buildings owned by the District.

Modern lighting systems were installed in part or complete in 21 school buildings. It is our intention to equip as many buildings each year not already provided with an adequate lighting system as is possible without neglecting other more urgent repairs.

New heating plants were installed during the year in three buildings. This was all that could be done with funds available.

During the year there was turned over to us by the War Department a good deal of surplus war material which was placed in stock and will be used in general repair work wherever practicable.

During the year we have been very much hampered by our inability to secure competent mechanics in the various trades owing to the rate of compensation paid by outside contractors being so much greater than the wage schedule of the District. This is continuously getting to be a more serious matter in the shop.

We still have three foremen who are not furnished automobile transportation in the daily inspection of their work, but if Congress grants us the additional automobile asked this year the shop will be fully equipped. In this connection our foremen have been able to render at least 50 per cent better service since automobile transportation has been furnished them.

The estimated repairs for the fiscal year beginning July 1 are over $1,000,000. Congress appropriated $300,000 to do this work. The number of buildings is increasing each year, and the repairs upon the old buildings are also increasing; it is therefore impossible to do any but the most urgent repairs with the appropriation available.

Attention is invited to the urgent need of additional storage room at this shop for both material and for our automobiles. At the present time the automobiles are stored at night in the hallways, the tin shop, machine shop, and in the stable. We have asked Congress to give us an appropriation to take care of this item in the next District appropriation act. There has never been any garage at this shop.

The organization of the shop is the same as it was last year, composed of 5 annual employees, the superintendent, assistant superintendent, and 3 clerks, and from 115 to 225 per diem employees of the various trades. This number increases and decreases according to the season of the year and the amount of work in hand.

We have followed the practice of the last few years in compiling this report. Should more detailed information be desired we can furnish a detailed statement of the cost of every job, or we can furnish the expenditures under each class of work upon each and every building.

HENRY STOREY,
Superintendent of Repairs, District of Columbia.

To the MUNICIPAL ARCHITECT.

Public schools, District of Columbia, 1923, repairs to buildings.

Appropriation		$250,000.
Stock on hand June 30, 1922		58,783.
Total		308,783.
Expended as follows:		
Carpentering	$70,771.05	
Tinning	22,219.94	
Heating	46,426.03	
Plumbing	12,877.89	
Painting	50,686.97	
Glazing	4,714.30	
Grading and cement work	13,796.31	
Gas and electrical work	15,841.67	
Miscellaneous (in this item is included the upkeep of 1617 U Street)	16,595.44	
Gas, electricity, ice, coal, telephones, and car tickets (pro rata share)	1,474.96	
Forage (pro rata share)	3,960.88	
Engineer stables (pro rata share)	859.56	
Sand wharf (pro rata share)	85.00	
Stock on hand June 30, 1923	48,252.01	
Unexpended balance	221.90	
		308,783.9

Fire Department, District of Columbia, 1923, repairs to engine houses.

Appropriation		$20,000.
Expended as follows:		
Carpentering	$7,072.35	
Tinning	1,362.94	
Heating	2,437.31	
Plumbing	1,540.25	
Painting	5,662.78	
Glazing	132.83	
Grading and cement work	263.71	
Gas and electrical work	1,103.28	
Miscellaneous	11.64	
Pro rata charge for upkeep of stables, telephones, gas, coal, electricity, ice, forage, etc	396.17	
Balance	16.74	
		20,000.

Metropolitan police, District of Columbia, 1923, repairs to stations.

Appropriation		$7,000.
Expended as follows:		
Carpentering	$737.97	
Tinning	519.83	
Heating	957.80	
Plumbing	535.58	
Painting	2,558.43	
Glazing	138.13	
Grading and cement work	680.02	
Gas and electrical work	408.72	
Miscellaneous	135.87	
Pro rata charge for upkeep of stables, telephones, gas, coal, electricity, ice, forage, etc	160.99	
Stock on hand June 30, 1923	162.36	
Balance	4.30	
		7,000.

RT OF CONSTRUCTING ENGINEER, DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY.

LORTON, VA., *August 6, 1923.*

: I have the honor to submit herewith report of the operations e construction division of the workhouse and reformatory for scal year ended June 30, 1923.

ork on projects as described in the report of last year has been nued in accordance with a schedule as previously described.

REFORMATORY BUILDINGS.

the reformatory, besides the work on the industrial railroad, ermanent building program was continued.

e actual construction work done consisted of the main structure e new buildings and the interior finishing of buildings con- ted prior to the past year.

June 30, 1923, there were 11 buildings completed or under ruction, consisting of 5 shop buildings, 2 dormitories, 2 dis- nary dormitories, 1 wash house, and the remodeling of an old house. Of these buildings four are complete except for con- ng up the heating and lighting systems; three complete except eneral interior work; the roofs being put on two and the brick- in progress on the other two.

proximately 200 feet of steam tunnel was constructed.

op building No. 19 has been put into service as an automobile ge in basement, broom factory, print shop, and store rooms on ain floor.

op building No. 20 has been used as a store room for construc- naterials and an office for the foreman.

op building No. 21 has been equipped with a motor driven, ersal woodworking machine, which will be used for making of the mill work for the remaining buildings.

ork is being pushed as rapidly as material deliveries will permit modeling the old heating plant and installing steam pipes in eating tunnels to provide heat for the completed buildings.

the construction work progresses a greater interest is shown e prisoners engaged on the various trades. A number of men are becoming quite proficient as bricklayers, carpenters, nt finishers, etc. This fact is more clearly demonstrated by the nit costs on this work.

ese figures are based on the cost of bought materials and hired used directly on the work. No charge is made for overhead prisoner labor, and bricks, as the cost of maintaining a prisoner affected by building operations, and the bricks used are manu- red on the reservation.

of laying 1,000 bricks, including cement and lime	$13.59
of placing one square of slate roofing, including trusses, pur-, etc	34.08
ge cost of buildings per cubic foot	0.109

ese unit costs could be further reduced and the quality of the improved by the establishment of good trade schools where the tes could be thoroughly instructed in the various building

trades before being placed on the actual construction of permanent buildings.

In addition to the work on the reformatory group of permanent buildings a 10-room employees' quarters was constructed and a 5-room brick bungalow.

INDUSTRIAL RAILROAD.

During the past year the following described work was done on the industrial railroad between the workhouse and reformatory:

A brick tunnel under the county road near the superintendent's residence was constructed. The roadbed between this point and the main highway was graded by the reformatory and a section about 1,500 feet long extending north from the workhouse was graded by the workhouse men. Considerable work was also done in trimming down the banks in cuts and widening the fills over the reformatory sections of this road preparatory to laying track.

On the reformatory section of this road 2,300 feet of track was laid and on the workhouse section about 300 feet was laid. As the ties and other materials for this construction were stored at both institutions and as separate gangs of men from each institution were employed on this work it was found advantageous to start the track work at the ends of this new section, with the object of connecting and completing the road at the site of a bridge over the main highway.

Work was started in June on grading the highway and excavating for the abutments of this bridge. With a sufficiently large force of men kept constantly on this work and other conditions favorable the section of the industrial railroad between the reformatory and workhouse should be ready to put in operation during the coming winter. Another locomotive and some additional cars are badly needed for this road. The completion of this section of the railroad will greatly facilitate the building operations at the reformatory, as all building materials can then be transported direct by rail to the building site, and in view of the proposed increase in the inmate population building operations can be pushed more rapidly provided sufficient funds are available to carry on this work.

To make a fair showing on reformatory permanent construction annual appropriations of at least $60,000 should be made for this work.

WORKHOUSE.

Considerable repair work was required on the old temporary buildings to keep them in habitable condition. This expense should be greatly reduced when new buildings are constructed and put in use.

Preliminary plans for the group of permanent workhouse buildings have been prepared and building operations will be started as soon as possible after these plans are completed and approved. When construction is started annual appropriations of at least $50,000 should be made for this work.

CENTRAL POWER PLANT.

During the month of August, 1922, the central power plant on Occoquan Creek was put in operation. This plant furnishes electricity for lighting and power for both institutions. Further developments of this power plant include the construction of a new high-tension transmission line from this plant to the workhouse and reformatory and the furnishing of heat and power for the manufacturing industries in the vicinity of this plant, including the brick plant.

BRICK PLANT.

With the beginning of permanent construction at the workhouse and the increasing demand for bricks for school buildings in Washington, a greater production of bricks will be required at the brick plant. Preliminary plans with estimates for the installation of duplicate machines have been prepared. This plant should be kept in first-class condition and operated to its fullest capacity, as the demands for bricks will increase steadily and the abundant supply of excellent shale and clay from which these bricks are made is available in very few brick plants about Washington.

PUMPING STATION.

Since January, 1923, a new electric driven centrifugal pump has been operating successfully in the pumping station. The installation of this new pump has made possible the discontinuing of firing the steam boiler in the old stone crusher house (formerly used to supply steam for the old steam pumps) and has effected a great saving of coal. Preliminary plans have been prepared for constructing a new pumping station in connection with the central power plant with settling basins, filter beds, etc. It is also very essential to have a storage tank or reservoir in the vicinity of the new reformatory to provide a reserve water supply for that institution in case the water supply main should break.

It is also planned to equip a building near the central power plant as a machine shop. A number of machines have been obtained from the Army surplus supplies for this place. This department has also obtained a large quantity of other surplus Army supplies and tools for both institutions.

The following tables give the cost of the various construction and repair jobs at both institutions. The cost of each permanent building at the reformatory is reported separately and its previous cost proportioned from the lump sum cost of permanent buildings from report of last year. The cost of each job is taken from the actual cost of hired labor and bought materials actually used on that particular job and do not include overhead expenses, transportation, etc. The total expenditures from the appropriations may be obtained from the reports of the chief clerk at the workhouse and at the reformatory.

Work at the District of Columbia workhouse.

Title.	Number days prison labor.	Number bricks.	Cubic yards sand and gravel.	Paid labor.	Bought material.	Cost previously reported.	Total chargeable to the appropriation.
Central power plant	148			$230.64	$265.35	$411.65	$877.64
Locomotive house						1,337.95	1,337.95
Repairs at brickyard	127	8,350	53	88.96	1,335.34	4,995.83	6,420.13
Superintendent's residence	335			717.85	921.59	1,686.30	3,325.74
Ninth Street Wharf	16			65.51	80.22	1,116.65	1,262.38
Work at shipyard	587			492.50	125.69	5,456.20	6,074.39
Railroad trestle, etc						4,247.25	4,247.25
Railroad tunnel	131			44.02	21.22		65.24
Railroad (general work)	1,910			221.33	37.09		258.42
Assistant superintendent's residence	194			354.62	229.46	911.32	1,495.40
Female department	494	4,675		687.59	674.09	1,512.39	2,874.00
Road work	395			35.00			35.00
Dry dock	17			47.12			47.12
Total							28,320.73

CONSTRUCTION AND REPAIR FOR ADMINISTRATION AND UPKEEP.

Temporary buildings, residences, etc	5,488	8,080	5	9,696.04	7,313.82	33,021.78	50,031.64
Construction engineer truck						20.84	20.84
Total							50,052.48

Total chargeable to the appropriation this year, $78,373.21.

Work at the District of Columbia Reformatory.

PERMANENT CONSTRUCTION.

Title.	Number days prison labor.	Number bricks.	Cubic yards sand and gravel.	Paid labor.	Bought material.	Cost previously reported.	Total chargeable to the appropriation.
Dormitory building No. 14	306	12,000	9	$231.94	$198.32	$77.64	$477.90
Dormitory building No. 15	1,000	35,400	30	1,865.39	2,727.75	1,815.42	6,408.56
Wash house, building No. 16	679	72,615	63	918.05	423.02		1,341.07
Discipline dormitory building No. 17	1,209			2,223.83	6,870.25	8,489.02	17,583.10
Discipline dormitory building No. 18	91			435.23	26.84	8,011.93	8,474.00
Shop building No. 19	188			444.79	1,104.92	8,203.00	9,752.71
Shop building No. 20	679			465.77	1,186.39	6,726.36	8,378.52
Shop building No. 21	1,539	82,992	72	940.91	3,258.41	43.50	4,242.82
Shop building No. 22	1,473	105,000	83	830.71	3,016.00	110.00	3,956.71
Shop building No. 23	1,665	105,000	83	593.11	1,462.09	110.00	2,165.20
Remodeling boiler house	550	10,000	8	289.01	651.08		940.09
Miscellaneous, including sewers, etc	2,142	64,326	6	3,047.06	1,884.09	5,533.76	10,464.91
Workmen's quarters	655			691.46	302.35		993.81
Brick bungalow	1,413	43,000	4	1,452.09	1,763.90		3,215.99
Railroad	3,582	35,000	3	2,412.61	396.31	22,600.40	25,409.32
Locomotive house						697.55	697.55
Railroad tunnel	888	140,000	11	731.50	661.33		1,392.83
Overhead bridge	105			60.50			60.50
Construction engineer truck					69.53	1,072.01	1,141.54
Total chargeable to permanent construction							107,157.13

Work at the District of Columbia Reformatory—Continued.

CONSTRUCTION AND REPAIR FOR ADMINISTRATION AND UPKEEP.

Title.	Number days prison labor.	Number bricks.	Cubic yards sand and gravel.	Paid labor.	Bought material.	Cost previously reported.	Total chargeable to the appropriation.
Temporary buildings residences, etc.	1,746			$1,118.23	$125.87	$35,104.49	$36,348.59
Central power plant				183.32	70.48	64,753.20	65,007.00

HERBERT R. HAAR,
Constructing Engineer.

The MUNICIPAL ARCHITECT.

REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT.

WASHINGTON, D. C., *August 16, 1923.*

SIR: The annual report of the water department for the fiscal year ended June 30, 1923, is submitted herewith.

The total length of water mains laid during the fiscal year is 83,849 feet, or 15.9 miles, which is an increase of 4.1 miles over the amount laid last year. Total length of water mains of various sizes in service is 674 miles.

The mean daily water consumption for the fiscal year is 63,982,461 gallons, giving a mean daily per capita consumption of 142 gallons, estimated on a population of 450,000.

The principal work involving water main construction consisted of the laying of 4¼ miles of 20-inch cast-iron water pipe from Chevy Chase Circle to Georgia Avenue and Military Road. This work completes a line long needed in the third high service system forming a second through line of water main from the pumping station to the Reno Reservoir. Newly opened subdivisions east of Chevy Chase and in the vicinity of Walter Reed Hospital, as well as Takoma Park, will be benefited primarily by this extension.

Other mains of smaller size but of considerable importance are listed herewith:

Especially important work done during the year includes (1) replacement at the District pumping station of our 2,500,000 gallon Holly pumping engine for the third high service with a 10,000,000 gallon centrifugal pumping unit; (2) necessary repairs made to our present Nos. 5 and 6 boilers, which will probably add almost six years to the life of same; (3) replacement of the original slightly worn gear, pinion, and bearings on No. 3 engine with new ones, enabling us to carry the originals as spares; (4) installation at Reno pumping station of mufflers and self-starters, in addition to overhauling the engines; (5) necessary repairs made to the air pump on No. 7 engine; and (6) necessary repairs to the broken lightning rod on the brick chimney at the District pumping station.

Construction work now in progress by the United States Government will provide light, heat, and power to one Government departmental building, and when completed a saving of approximately 1,500,000 gallons of filtered water per day now being consumed for

condensing purposes will be effected. This improvement will be placed in service before the end of the present year.

The project for the extension of the first high service of Anacostia had not been started at the end of the fiscal year, but will be begun prior to the completion of the Smothers School, for the adequate service of which this extension was found desirable, and, further, other points having considerable elevation will be benefited.

During the year an estimate and general outline of the proposed high pressure fire service were completed.

The water department also made an exhaustive study of the trunk lines necessary to give to outlying territories which are rapidly outgrowing their present supply lines an adequate water supply, the most important of these projects being submitted with requests for appropriations for the next fiscal year.

The department wishes to call attention to the fact that water main extensions must be denied to isolated sections sparsely built up on account of lack of funds to provide for these cases. It is now the practice to allow the owners the privilege of laying small services at their own expense. This is not considered good practice, because no fire protection is possible.

Detailed reports of the several subdivisions of the department are on file in the superintendent's office.

J. S. GARLAND,
Superintendent Water Department, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION.

The 30-inch main was extended in Adams Street from Flagler Street to First Street NW.; from its end a 12-inch main was laid in First Street north to Bryant Street to reinforce the second high service in this vicinity.

A 20-inch main was laid from Chevy Chase Circle, through Rock Creek Park, to Georgia Avenue, and south on Georgia Avenue from Fern Street to Military Road NW. This main acts as a trunk main for the third high service and gives an adequate supply of water for fire protection, as well as a supplemental supply for domestic purposes, in the territory through which it passes, as connections were made at intervals with service mains. This completes a loop, long needed, from the Bryant Street pumping station to Reno Reservoir and return. This work was started in November and finished the latter part of June. Total length about 4¼ miles.

Twelve-inch water mains were laid as follows:

Thirty-first Street, between Tennyson and Stephenson Streets NW.
Kalmia Street, between Alaska Avenue and Georgia Avenue NW.
Ingraham Street, between Thirteenth and Fourteenth Streets NW.
Albemarle Street, between Forty-ninth Street and Massachusetts Avenue NW.
Columbia Road, westward from Harvard Street NW.
Belmont Road, between Massachusetts Avenue and Tracy Place NW.
Grant Street, east from Minnesota Avenue NE.
Grant Street, between Division Avenue and Fifty-third Street NE.
Keokuk Street, east from Thirty-seventh Street NW.

The most important 12-inch main laid was the one in Ingraham Street, between Thirteenth and Fourteenth Streets NW. This main

will give a supplemental supply to the third high-service area west of Fourteenth Street.

The 12-inch main laid in Grant Street, east of Minnesota Avenue NE., gives to a number of old houses the necessary supply for domestic use, as well as proper fire protection.

Repaired the 36-inch United States Government main in First Street SE. three times during the year.

A 10-inch water main was laid for the United States Government across the New Key Bridge. The necessary material for this work was furnished by the Federal Government.

Preliminary work was started for the purpose of offsetting the 36-inch main on Canal Road, at College Pond, due to a break in main at this point.

The old double line of 30-inch arched pipe over College Pond, adjacent to the Canal Road, was removed, necessitating the reconnection of these mains below the surface of the ground.

Reservoirs were cleaned and grounds kept in condition throughout the year.

INSTALLATION AND MAINTENANCE OF WATER METERS.

One thousand four hundred and sixty District of Columbia meters were installed inside of buildings, and 1,319 meters were installed outside, or a total of 2,779 new meters for the year.

On June 30, 67,567 services were metered, leaving 10,112 unmetered services, 86.9 per cent of the services being metered.

Five thousand and two District of Columbia owned meters were removed and replaced for the following reasons:

Not registering	3,314
Lack of pressure	153
Leaking	981
For test	19
On account of noise	20
Defective registers	426
For building purposes	53
Abandoned to new services	36
District of Columbia owned meters—miscellaneous:	
Repaired in place	217
Abandoned and removed	57
Adjusted to grade	130
Private meters:	
Not registering, removed	231
Reset after repairs	383
Repaired in place	54
Leaking, repaired	98
Lack of pressure	18
Removed for test	10
Defective registers	10
Set District of Columbia owned meters temporarily in place of private meters	155
District of Columbia owned meters removed and private meters reset	122
Miscellaneous:	
Replaced covers on curb boxes	219
Replaced meter box frames and covers	142
Curb boxes adjusted to grade	55
Replaced curb boxes	100
Taps made	2,816
Taps removed and main plugged	37
Service pipes inspected	2,823

STEAM ENGINEERING.

The following is a summary of the work done at the District pumping station for the year:

Water pumped, figured from plunger displacement:		
First high service	gallons	7,184,763,320
Second high service	do	3,453,116,300
Third high service	do	1,449,619,160
Total	do	12,087,498,780
Fourth high service	do	93,291,650
Coal burned	tons	7,632
Cylinder oil used	gallons	601
Engine oil used	do	1,290
Filtered oil used	do	915
Turbine oil used	do	1,170
Grease used	pounds	484
Waste used	do	701

The regular force employed at this station in the daily operation of the pumping engines, boilers and auxiliaries, cleaning of machinery, etc., consisted of three crews of three engineers in charge, three assistant engineers, three firemen, three oilers, and three cleaners, working in eight-hour alternate shifts, "six days on and one day off" per week, being relieved on "days off" by an extra engineer crew.

For the fourth high service the water is pumped from the Reno Reservoir, which is supplied by the third high-service pumps, to an elevated tank by gasoline engines and triplex pumps. This machinery is operated daily by three enginemen who work on eight-hour shifts. The water pumped for this service during the year was 93,291,650 gallons, or a mean of 255,594 gallons daily.

The Anacostia pumping station has been operated without interruption during the year, pumping to the three towers supplying the area east of the Anacostia River. This station is taken care of by four enginemen who work on eight-hour shifts. The water pumped for this service during the year was 154,292,300 gallons, or a mean of 405,227 gallons daily.

The total pumpage for the year at the District pumping station was 347,414,610 gallons more than in 1921–22. The greatest amount pumped in one day (June 26) was 40,320,730 gallons, least in one day (August 13) was 29,289,760, and the average dynamic head against pumps was 129.16 feet. The total operating expenses (excluding overhead chargeable to pumping) was $115,748.16, as against $102,637.92 in 1921–22, making the total operative cost (excluding overhead) of pumping 1,000,000 gallons of water into the mains $9.58. This is $0.84 per million gallons more than in 1921–22, and is mainly due to an increase in the cost of the coal used. The average cost of coal per ton for the year was $8.59, which was $1.65 more than in 1921–22.

The station duty for the year was 78,695,799 foot-pounds per 100 pounds of coal. This is 4 per cent more than the duty obtained during the preceding year, and represents an annual saving of approximately 307 gross tons of coal. This saving in coal may be attributed almost entirely to the improved economic pumping operations.

WATER SURVEYS.

UNDERGROUND LEAKAGE INVESTIGATION.

The item of accomplishment of principal importance in this work was the detection and stoppage of the waste of 755,000 gallons daily, over three-quarters of a million gallons, or, in other words, over 1 per cent of the total daily supply to the entire city. This item is considerably less than the comparative figure of last year, due entirely to the fact that the normal force operating upon this work has been utilized for a very great portion of its time assisting on "complaint investigation" which required immediate attention and upon the elimination of abandoned services, which were over 300 cases in arrears when turned over to this division in the early part of the year. A total of 169 individual leaks was found, averaging 4,468 gallons daily each. The chief source of leakage was the lead-calked joints, both numerically and considering the quantity discharged per joint. A total of 33 leaking joints, averaging 6,815 gallons per day each and totaling 224,910 gallons daily, was found during the year. Second in importance were 25 corroded iron service pipes, averaging 6,125 gallons per day and totaling 155,120 gallons daily waste.

COMPLAINT INVESTIGATION.

The work under this head embraced strictly routine disposal of complaints received directly by letter and telephone or through the police department, health department, and other channels concerning defects and nuisances pertaining to the water system. Much of the work of this division also arises from complaints of water in cellars and other nuisances due to obstructed sewers. A complete and positive determination is made in each of these cases before these matters can be referred to the proper offices. This involves much work and consequent expense, from which no direct return is secured. In effect, this division is the clearing house for many nuisances not arising from the distribution of water.

The complete accomplishment of the water-survey division under all classifications is presented in tabulated statements on file in the superintendent's office.

STOREKEEPING.

The cost of operating the storeroom for the year was 2.64 per cent of the value of material issued and equipment disposed of, as compared with last year, i. e., 3.45 per cent.

The value of material issued and equipment disposed of during the year was $557,288.53, and the total wages, salaries, and per diem paid to employees of the storeroom during the year was $14,689.39.

A complete inventory of all material and equipment owned by the department was prepared and forwarded to the auditor, District of Columbia. This inventory also showed all receipt and expenditures of material and equipment from October 1, 1921, to September 30, 1922.

Collected, stored, weighed, counted, and delivered to the contractors old material to the value of $1,836.12.

All equipment which was worn out during the year was collected, inspected, and condemned by the survey officer, and disposed of as ordered by the auditor.

The values of material and equipment received and issued during the year were as follows: Material received, $459,178.79; issued, $468,279.22; equipment received, $21,430.07; issued, $89,009.31.

The value of material on hand at the close of the year was $175,748.37, and the value of equipment in stock and in service at the close of the year was $646,263.20.

TRANSPORTATION.

The present transportation equipment consists of 45 automobile trucks, ranging in capacity from a light Ford roadster to a 5½ ton Mack truck. During the year we have increased this equipment by 10 trucks.

Hauled for use by the construction forces and for storage in the property yards 27,180,000 pounds of material; about 13,590 tons.

Hauled from construction jobs to various dumps, 1,487 loads of dirt; about 5,200 cubic yards.

Hauled from the pumping station to various jobs and dumps 313 loads of ashes; about 1,565 cubic yards.

The charges for use of our heavy trucks on general hauling, per 8-hour day, are as follows:

5-ton truck with driver	$16
3½-ton truck with driver	14
2½-ton truck with driver	12
2-ton truck with driver	12
1-ton truck with driver	9

While these rates are only about one-half the rates charged by contractors the total charges for use of our heavy trucks during the year exceeds the cost of maintenance and operation of those trucks by $2,157.88.

The cost of maintenance and operation of these trucks includes gasoline, oils, grease, tires, miscellaneous supplies, material, and labor expended in making repairs, garage rent, driver's wages, and a charge for depreciation.

TABLE I.—*Cost of work done by the water department for the year ended June 30, 1923.*

Heads of expenditure.	Per diem and salaries.	Material expended, cuts and transportation.	Total expenditures.	Charge to general account.		Hauling and deposit accounts, Dr.
				Maintenance.	Extensions.	
Water surveys (detection of leaks)	$22,880.36	$2,847.00	$25,707.36	$25,707.36		
Maintenance of meters	29,209.84	7,614.24	36,824.08	36,824.08		
Installation of meters	12,027.52	37,026.99	49,054.51		$49,054.51	
Office of water registrar	64,151.51	7,648.82	71,800.33	71,800.33		
Inspection and repair of services	16,413.66	3,368.85	19,782.51	19,782.51		
Tapping water mains	6,396.33	7,016.19	13,412.52		13,412.52	
New service installed	91.54	91.41	182.95		182.95	
Engineering (field surveys)	22,774.44	2,305.13	25,079.57		25,079.57	
Hauling account	16,509.85	7,540.78	24,050.63			$24,050.63
Operation and repair of valves, fire hydrants, etc.	24,344.89	3,718.90	28,063.79	28,063.79		

TABLE I.—*Cost of work done by the water department for the year ended June 30, 1923*—Continued.

Heads of expenditure.	Per diem and salaries.	Material expended, cuts and transportation.	Total expenditures.	Charge to general account.		Hauling and deposit accounts, Dr.
				Maintenance.	Extensions.	
Installation of fire and public hydrants	$3,093.13	$13,684.53	$816,777.66	.....	$16,777.66	.....
Water mains laid	112,217.02	211,914.59	324,131.61	.....	324,131.61	.....
Repairs to leaks	22,326.92	9,067.05	31,393.97	$31,393.97	.....	.....
Maintenance of reservoirs, lodges, and towers	3,513.67	725.93	4,239.60	4,239.60	.....	.....
Care of grounds	8,458.69	271.19	8,729.88	8,729.88	.....	.....
Repayment and deposit work	12,886.26	14,895.16	27,781.42	.....	.....	$27,781.42
Replacement work, lowering mains, etc	10,498.27	13,008.47	23,506.74	23,506.74	.....	.....
Plans, estimates, and tests	15,630.93	324.37	15,955.30	10,636.87	5,318.43	.....
Care of Bryant Street pumping station	24,097.47	8,309.30	32,406.77	32,406.77	.....	.....
Operation and repair pumps, Bryant Street station	48,865.71	67,749.05	116,614.76	116,614.76	.....	.....
Operation and repair pumps, Reno station	5,829.99	1,611.64	7,441.63	7,441.63	.....	.....
Operation and repair pumps, Anacostia station	7,765.15	2,925.96	10,691.11	10,691.11	.....	.....
Shopwork	17,721.72	17,192.53	34,914.25	34,914.25	.....	.....
Furnished other District of Columbia offices	3,707.61	136.38	3,843.99	3,843.99	.....	.....
Gross expenditures	511,392.48	440,994.46	952,386.94	466,597.64	433,957.25	51,832.05

SUMMARY.

Expenditures:		Charge to:		Per cent.
Per diem pay rolls	$416,899.02	Maintenance	$466,597.64	52
Salary pay rolls	94,493.46	Extensions	433,957.25	48
Total services	511,392.48			
Material expended, cuts, etc	440,994.46			
Gross expenditures	952,386.94			
Less transportation and repayment credits	51,832.05			
Net expenditures	900,554.89		900,554.89	100

TABLE II.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work.*

Diameter.	In service June 30, 1922.	Laid during year ended June 30, 1923.	Abandoned during year ended June 30, 1923.	In service June 30, 1923.
3-inch ..... linear feet	85,771	1,250	.....	87,021
4-inch ..... do	155,164	643	.....	155,807
6-inch ..... do	1,467,961	1,284	.....	1,469,245
8-inch ..... do	985,877	51,246	446	1,036,677
10-inch ..... do	9,107	.....	.....	9,107
12-inch ..... do	425,012	5,405	.....	430,417
16-inch ..... do	29,584	1,629	.....	31,213
20-inch ..... do	119,738	21,773	.....	141,511
24-inch ..... do	36,133	.....	.....	36,133
30-inch ..... do	58,000	595	.....	58,595
36-inch ..... do	59,433	24	.....	59,457
42-inch ..... do	23	.....	.....	23
48-inch ..... do	44,172	.....	.....	44,172
75-inch ..... do	600	.....	.....	600
Total	3,476,575	83,849	446	3,559,978
Stop valves	11,352	307	86	11,573
Fire hydrants	3,814	160	56	3,918
Public hydrants	253	24	3	274
Sanitary fountains	21	2	.....	23
Horse fountains	153	3	1	155
Public wells	44	.....	.....	44

TABLE III.—*Statement of the length and cost of water mains laid from July 1, 1878, to June 30, 1923, paid from water department funds.*

Diameter.	In service June 30, 1922.	Laid during year ended June 30, 1923.	Abandoned during year ended June 30, 1923.	In service June 30, 1923.
3-inch ..... linear feet	77,159	12	.....	77,171
4-inch ..... do	116,370	51	.....	116,421
6-inch ..... do	1,078,981	392	.....	1,079,373
8-inch ..... do	926,310	50,669	446	976,533
10-inch ..... do	6,739	.....	.....	6,739
12-inch ..... do	368,996	5,147	.....	374,143
16-inch ..... do	22,436	1,626	.....	24,062
20-inch ..... do	108,636	21,773	.....	130,409
24-inch ..... do	15,653	.....	.....	15,653
30-inch ..... do	20,437	591	.....	21,028
36-inch ..... do	38,244	.....	.....	38,244
42-inch ..... do	23	.....	.....	23
48-inch ..... do	14,309	.....	.....	14,309
Total	2,794,293	80,261	446	2,874,108

Total cost to June 30, 1922	$4,477,732.02
Total cost for year ended June 30, 1923	324,131.61
Aggregate cost to June 30, 1923	4,801,863.63

REPORT OF THE WATER REGISTRAR.

WASHINGTON, *August 15, 1923.*

SIR: I submit herewith the annual report of the revenue and inspection branch of the water department, showing in detail the work accomplished during the year ended June 30, 1923.

WATER RATES.

The rate for domestic purposes is charged according to stories and front feet. On all tenements two stories high with a frontage of 16 feet or less, $6.25 per annum; for each additional front foot or fraction thereof greater than one-half, 39 cents; for each additional story or part thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume of business, and water facilities, and rate from $1 to $25. If the flat rate on business establishments reaches $25 or more, the owner or occupant is required to install a water meter at his own expense.

A minimum rate of $5.65 will be charged against all consumers supplied with water through meters, which allows the use of 7,500 cubic feet of water during the year; water used in excess thereof will be charged for at the rate of 5 cents per 100 cubic feet.

TABLES.

The table of comparative revenues shows a total collection of $1,104,636.79.

Table 1 shows statement of cash receipts of the water fund.

Table 2 shows comparative statement of revenues.

Table 3 shows general information.

GEO. W. WALLACE,
Water Registrar.

The SUPERINTENDENT, *Water Department.*

TABLE 1.—*Statement of collections.*

Water rents:	
Flat rate	$103,160.54
Meters	865,452.68
Building purposes	6,692.07
Total	975,305.29
Water-main tax, principal and interest	128,372.29
Miscellaneous receipts	959.21
Total	129,331.50
Total receipts	1,104,636.79
Taps and stop cocks	15,461.84

TABLE 2.—*Statement of cash receipts of the water fund, District of Columbia, for the fiscal years from June 30, 1912, to June 30, 1923.*

Year.	Water rents.	Water-main tax, principal and interest on same.	Miscellaneous receipts.	Year.	Water rents.	Water-main tax, principal and interest on same.	Miscellaneous receipts.
1912	$545,405.47	$122,458.81	$2,817.50	1920	$771,161.55	$43,121.19	$1,164.01
1913	640,008.64	138,693.57	3,153.81	1921	984,055.23	78,989.83	1,557.73
1914	646,296.15	86,379.21	4,253.20	1922	943,182.45	86,425.56	2,455.49
1915	638,861.89	66,107.56	3,532.77	1923	975,305.29	128,372.29	959.21
1916	624,882.18	64,647.80	1,761.39				
1917	635,664.31	61,990.43	2,019.58	Total	8,902,370.80	940,015.14	25,616.23
1918	714,388.28	34,649.46	458.96	1924[1]	955,000.00	85,000.00	1,000.00
1919	782,159.36	28,179.43	1,482.58	1925[1]	950,000.00	85,000.00	1,000.00

[1] Estimated.

TABLE 3.—*General information.*

	Cubic feet.
Consumption of water through meters:	
District meters	643,602,300
District meters in municipal buildings	82,698,100
Private meters	845,753,900
Private meters in charitable institutions	26,979,200
Total	1,599,032,900

Meters in service.	In use June 30, 1922.	Installed 1923.	Abandoned 1923.	Total in use June 30, 1923.
District meters	61,228	2,837	312	63,753
District meters in municipal buildings	264	.....	.....	264
Private meters	2,864	475	15	3,354
Private meters in charitable institutions	189	7	.....	196
Total	64,545	3,319	327	67,567

Average cost of reading meters	$0.20
Average cost of computing and making bills	$0.23
Average payment for premises in which meters were installed	$7.13
Average payment for flat-rate accounts	$10.20
Premises receiving an allowance of free water:	
Number of institutions	166
Number of meters	196
Cubic feet of water consumed	26,979,200
Allowance of free water	31,644,965
Number of institutions exceeding allowance	38

Water services:	
In use June 30, 1922	75,011
Installed 1923	2,982
Total	77,993
Abandoned 1923	314
In use in June 30, 1923	77,679
Metered	67,567
Not metered	10,112
Percentage of services metered	86.98

REPORT OF THE SANITARY ENGINEER.

WASHINGTON, D. C., *August 31, 1923.*

SIR: The annual report of the sanitary engineer, covering the fiscal year ended June 30, 1923, is submitted herewith.

In presenting this report attention is again called to the fact that the extension of the District sewer system has not kept abreast of the growth of the city, and at this date there is urgent need for the expenditure on suburban trunk sewers alone of practically $3,000,000.

In addition a more vigorous prosecution of continuing work on the interceptors is urged. In the last 30 years there has been expended over $6,000,000 on the sewage-disposal system, to intercept and remove all sewage which originally discharged into the watercourses flowing through the District. To complete this system of interceptors, devised to eliminate the pollution of these streams, will require the expenditure of slightly more than $1,000,000, and at the rate at which appropriations have been made available for the past 10 years it will be 18 years before this work is finished.

A situation which should be carefully noted is that, through lack of funds, this division has been unable during the past year to provide sewers for many new buildings in progress or contemplated. The fiscal year 1923 ended with more sewers of this class ordered constructed than can be built with the funds available for the entire ensuing year. The above ordered sewers do not represent the total requested, for in many cases, requiring more than a nominal length, the sewer was not recommended. In many cases the applicant, at a distinct financial loss to himself, paid entirely for the public sewer. Over $25,000 worth of construction was thus paid for by private interests. The above condition is most regretable in view of the fact that the law providing that the benefited party must pay a special assessment for sewer service implies that he will be provided with such. During the past three years, the period of the revised assessment, there has been returned on account of sewer assessment $146,845, or 36 per cent of the total amount of the appropriations.

As a further result of insufficient appropriations, there are now in this, the Capital of the Nation, almost 3,000 privies, and what is more deplorable, the number of privies instead of growing less has been increased during the past year by 100.

The following is a summary of the sewerage and sewage-disposal systems, of June 30, 1923:

ngth of sewerage system (miles):		
Main sewers	153.82	
Pipe sewers	622.16	
		775.98
ngth of sewage-disposal system (miles)		36.69
Total length (miles)		812.67
st of sewerage system		$15,802,236.46
st of sewage-disposal system		5,975,232.96
Total cost		21,777,469.42

The sanitary engineer acknowledges the efficient and loyal service ndered by heads of sections and other employees of this division. A brief outline of the year's activities is recorded herewith, as llows:

SECTION OF OFFICE ENGINEERING.

[A. D. Black, principal assistant engineer, in charge.]

The work of this section comprises the computing, designing, and afting work incidental to studies for new construction, repairs, or provements, and for future extensions of the system. This secn also has charge of the map work of the division, the file system drawings, and is charged with the duty of furnishing the public ormation concerning the sewerage system, particularly as to the ailability, function, location, and size of existing sewers as reired in connection with building activities. In addition, this secn answers or indorses all letters and jacketed files requesting sewer nstruction.

During the year 2,146 plumbing slips were issued as to availability nonavailability of sewers. Eight hundred and sixty jacketed s were handled, each requiring an indorsement or the preparation a letter. Five hundred and eleven of the above files were reests for construction, each case requiring detail work as to sewer es and locations, estimated cost, and the preparation of an acnpanying plat or blue print showing all pertinent facts. To conve the very limited appropriation for service sewers, and with a w of serving the greatest number of houses per unit length of ver constructed, it has been the policy of this office to favorably ommend for construction only those sewers which did not require excessive length per house. As a result of this policy service was ovided during the year for 865 houses, requiring an average length sewer construction of 59 linear feet, at a cost of $232 per house. ur hundred fifty-three plats were forwarded to the assessor cover- cases where new subdivisions were made abutting existing service vers, where houses on parcel property were connected to a service ver, where trunk sewers were construed as service sewers, and as vance notice of pending sewer assessment. In connection with the ving of streets and sidewalks, 348 studies were made as to sewer uirements in order to avoid the cutting of new surface work. In it the establishment of new or the modification of existing street d alley grades affects the existing and future sewer construction, has been necessary during the year to study 166 cases of proposed

surface grades. Incidental to the extension of the sewer system, 31 rights-of-way deeds with accompanying plats were prepared, 26 of which were acquired. The commissioners authorized the corporation counsel to acquire, under a compromise settlement of $28,747.52, a tract of 36.9 acres at the location of the proposed sewage-treatment works, and its early acquisition is anticipated. Three parcels of land, with a combined acreage of 32.6 acres, have already been taken over for this purpose, and there is yet to be acquired a total of about 15 acres. During the year 36 contracts were prepared, all of which required specifications, plans, and estimated quantities. Many of these contracts required supplementary detailed drawings of junction chambers and other details. Throughout the year progress has been made on the future layout of the sewer system, necessitating studies of drainage areas, run-off, and corresponding sewer sizes. Maps have been kept posted to date by the plotting thereon of 307 separate pieces of new sewer construction, 839 cases of new subdividing, splits, alley and street openings or closings, new and revised street grades, location of 2,498 new houses constructed in county, etc. Twenty maps which had become badly worn were remade. In conjunction with the above, card indexes reflecting the various work done by this section were kept posted to date. In addition, 163 miscellaneous plats were required, making in all 1,194 drawings.

The work handled by this section is by far the most exacting of that required by any section, and the large part of the activities of this division are dependent upon the conduct of this office. With the low salaries available it has proven impossible to retain the services of technically trained men required for the proper handling of this work. Great credit is due the personnel of this force for the work that was actually performed. The turnover during the year reached the discouraging figure of 133 per cent.

The outstanding need for the betterment of this section is the creation of a subsection of computing to permit of an intelligent study of the very important question of drainage and sewer sizes, but, as stated last year, great difficulty has been experienced in obtaining the services of properly qualified men with the necessary education and knowledge of mathematics and hydraulics required to undertake this work.

SECTION OF SURVEY AND CONSTRUCTION ENGINEERING.

[C. C. Baden, assistant engineer, in charge.]

The work of this section covers the supervision of all contract work, preliminary surveys for and the staking out of all work done by day labor, detail survey work required in connection with studies for future work and office studies, and the acquiring of necessary field data and field inspection for special reports.

Work done under 28 contracts involved the construction of 3.78 miles of sewers at a cost of $229,525, as follows:

Of contracts awarded during the fiscal year 1922 and not completed during that year all were completed during the fiscal year 1923, as follows: O Street replacement sewer, in O Street NW., between First Street and New Jersey Avenue; Broad Branch trunk sewer, section 1, Nevada Avenue between Chappel Road and Lega-

Street; Monroe Street service sewer, between Eighteenth and ıtieth Streets; Stephenson Place service sewer, between Thirty-d Place and Utah Avenue NW.; Quesada Street service sewer, een Western Avenue and Broad Branch Road; M Street relief r, section 1, between Twentieth and Twenty-second Streets NW.; nteenth Street and Otis Street service sewer, in Seventeenth et between Newton and Otis Streets NE., and in Otis Street be-n Fifteenth and Seventeenth Streets NE.; Allison Street and teenth Street service sewer, in Allison Street between Blagden ıue and Eighteenth Street NW., and in Eighteenth Street be-n Allison and Varnum Streets NW.; Indiana Avenue invert, sec-1, Indiana Avenue NW., between First and Third Streets NW.

f contracts chargeable to 1923 funds and awarded during 1923, following were completed: Whittier Street and Fifth Street ce sewer, in Whittier Street between Third and Fifth Streets , and in Fifth Street between Whittier and Aspen Streets NW.; ce sewers for square south 1092, Commodore Barney Circle be-n Pennsylvania Avenue and Seventeenth Street SE., Kentucky ıue between Commodore Barney Circle and H Street SE., and eventeenth Street between Commodore Barney Circle and H et SE.; Twelfth Street service main, between Alaska Avenue and y Street NW.; Broad Branch trunk sewer, section 2, Nevada ıue, NW., between Keokuk and Northampton Streets; Thirty-h Street trunk sewer, section 2, between Legation and Livingston ets NW.; Livingston Street storm-water sewer, between Thirty-h and Forty-first Streets NW.; Massachusetts Avenue NW., ce sewer, between Yuma and Albemarle Streets; special deep ce sewer, Jackson Place NW., between Pennsylvania Avenue H Street; Connecticut Avenue storm-water sewer, between Ne-ka Avenue and Ingomar Street; Illinois Avenue trunk sewer, on 1, in Illinois Avenue between Webster and Allison Streets ; McKinley Street storm-water sewer, between Nevada Avenue Thirty-seventh Street NW.; Brooks Street and Forty-seventh et service sewer, Brooks Street, between Forty-fourth and Forty-ıth Streets NE., and Forty-seventh Street, between Brooks and s Streets NE.; Military Road service sewer, between Connecticut ıue and Thirty-second Street extended.

addition, progress was made during the year on the following contracts: Junction chamber between Florida Avenue and First et trunk sewers, First and Florida Avenue NW.; M Street f sewer, section 2, M Street, between Twentieth and Twenty-first ets NW.; Summer Road service sewer, between Bolling Field Nichols Avenue SE.; Warren Street service sewer, from Thirty- and Yuma Streets to Wisconsin Avenue and Van Ness Streets ; Eye Street service sewer, between Second and Third Streets ; Conduit Road service sewer, betwen Jewett Street and Little Road NW.

ıe following contracts, chargeable to 1923 were awarded but not ed during the year: New invert, Indiana Avenue trunk sewer, ɔn 2, from Third and D Streets to Fourth and E Streets NW.; d Place service sewer, between L and M Streets NE.; Quesada et service sewer, between Broad Branch Road and Thirty-third et; Potomac Avenue and E Street service sewer, between Eight-ı Street and Potomac Avenue and Nineteenth and E Streets

SE.; C Street service sewer, between Seventeenth Street and Ma chusetts Avenue SE.; M Street service sewer, between South Cap and Van Streets SE.; McKinley Street storm-water sewer, sectio McKinley Street, between Nevada Avenue and Thirty-seve Street NW.

Contracts chargeable to both 1923 and 1924 funds awarded dur the year but not started, were: Concrete invert, old Tiber sew section 5, in Canal Street SW., between C and South Capitol Stre upper Potomac interceptor, section 5, between Aqueduct Bridge Potomac Avenue extended.

The following contracts chargeable to 1924 funds were award work not yet started: Falls Branch storm-water sewer, section 1, tween River Road and Davenport Street and Wisconsin Avenue Fessenden Street; Spring Road replacement trunk sewer, section between Sixteenth and Thirteenth Streets NW.; Woodridge stor water sewer, section 1, Eastern Avenue between Monroe and New Streets NW.; Rock Creek main interceptor, section 10, in Rock Cr Park.

Of the above, the only work done toward completing the syst of interceptors of the sewage-disposal system was the awarding contract for section 5 of the upper Potomac interceptor, work which was not started.

The above contract work necessitated the preparation of 41 part and final measurement sheets. Sewer construction under day la required the staking out of over 12 miles of jobs. Over 26 m of profiles were run and plotted in connection with office stud As a permanent record of new construction, 199 detailed sheets w prepared and 183 plats were furnished the assessor showing in de the location of new service sewer, and 2 plats were forwarded to health officer indicating the location of new sewers where same al ted existing houses. Two hundred inspections and special rep were made on applications for the connection of area drains to se rate system sewers. To eliminate the preliminary inspecton in th cases and the accompanying report, recommendation was made this office to amend the Plumbing Code of the District to permit agreement to be signed by owner of premises if desiring an drain. This modification, collaborated in by the inspector of plu ing, is now being tried out, and in addition to the saving of time this office and by the inspector of plumbing's office, will relieve record room of filing and indexing some 200 applications each y

SECTION OF DAY LABOR CONSTRUCTION.

[T. Lanigan, overseer, in charge.]

The work of this section covers the construction by District fo of all new and replacement sewers, all storm-water catch-basin w and all repairs to the sewerage system.

During the fiscal year a total of 8.22 miles of pipe sewers w constructed under 332 jobs. The location of this sewer construc was distributed throughout the District as indicated below:

Within old city limits	
County west of Rock Creek	
County east of Rock Creek	
County west of Anacostia River	
County east of Anacostia River	

In addition to new sewer work, 108 storm-water catch basins were constructed during the year and 543 minor repair jobs were undertaken.

During the year four concrete-mixing machines were purchased for the four main construction gangs at a total cost of $1,270. Previous to the purchase of this equipment all concrete was mixed by hand, and from cost records since this innovation it is believed that, based on work done during the entire fiscal year, there would be a saving in the cost of mixing concrete alone of about $2,400. This reduced cost reflects a saving of from 3 to 10 cents per foot in the laying of pipe sewers. In an effort to still further reduce the cost of sewer construction the overhead has been slightly lowered by reducing the number of night watchmen by about 50 per cent.

The activities of this section are seriously handicapped by the provisions of the organic act of the District, requiring that day-labor work be confined to those jobs estimated to cost $1,000 or less. At the date of the passage of this act (June 11, 1878), owing to the then low cost of material and labor, it was possible to construct about 800 linear feet of sewer for $1,000, while at the present time but 200 feet of sewer can be laid for this sum, or about 25 per cent. To permit more elasticity in the functioning of this division, and coupled with the fact that construction appropriations for this division have increased from $20,000 in 1878 to $474,000 in 1923, it is believed desirable to have above organic act amended so as to permit the construction of sewers by day labor on work estimated to cost $5,000 or less.

SECTION OF CHIEF CLERK.

[J. H. Dick, computer, in charge.]

The work of this section covers the preparation of pay rolls, requisitions and vouchers, material and equipment accounting, cost keeping, and general records. In addition this section prepares monthly financial statements to permit of a study of available balances. It is necessary that a close watch be kept over the finances to prevent the forced lay off of employees toward the close of the fiscal year for lack of funds.

Inventory of material in the sewer division storehouse was taken and the annual inventory reports of expendable and nonexpendable material and equipment were forwarded, as were the quarterly reports of cost of operation, repair, and mileage of 18 motor vehicles charged to this division. In connection with the reclassification of Government employees returns were submitted covering the 57 statutory employees of the sewer division. Weekly reports covering day-labor and contract work performed, also daily reports showing the various activities of this division, were forwarded. A total of 66,169 reports and records were handled by this section.

Sick leave granted sewer division employees showed a reduction of 31 per cent over the previous year.

In accordance with act of Congress approved September 1, 1916, authorizing the Commissioners of the District of Columbia to enter into an agreement with the Washington Suburban Sanitary Commission with the view of providing for the connection of sewerage systems in the State of Maryland bordering the District of Columbia

with the system of said District, an agreement was prepared by this office and after approval by the commissioners was submitted to the commissioners of the Washington Suburban Sanitary District for their acceptance. No official reply to this agreement has as yet been received.

The work of this section covered the following expenditures from 1923 appropriations:

Cleaning and repairing sewers and basins	$80,000.00
Operation and maintenance of the sewage-pumping service	100,000.00
Main and pipe sewers and receiving basins	125,000.00
Suburban sewers	157,000.00
Assessment and permit sewers	150,000.00
Purchase or condemnation of rights of way	365.85
Upper Potomac interceptor	40,000.00
Miscellaneous appropriations	7,703.00
Miscellaneous trust-fund deposits	28,866.66
Contingent expenses	1,042.25
Total	689,977.82

SECTION OF OPERATION AND MAINTENANCE.

[H. Garner, inspector, in charge.]

The work of this section covers collecting rainfall data, recording flow in sewers, annual inspection of trunk sewers, inspection and maintenance of sewage regulators, sumps, and tide gates, cleaning storm-water outlets, gravel basins, and inverted siphons, investigating complaints, and cleaning and flushing basins and pipe sewers.

The data obtainable from the 4 automatic and 23 pot gauges in the District, distributed over 50 miles of area, and from the 104 cup gauges, installed in the sewers, is not sufficient for an intelligent study of run-off conditions and overcharging of sewers. It is believed that at a minimum at least 7 additional automatic rain gauges should be installed, and while but 5 additional cup gauges were installed during the year, it is proposed to install many more during 1924.

During the year there was an unusual number of storms of excessive precipitation:

July 3, maximum 5-minute rate, 6.34 inches per hour; total precipitation 1.08 inches.

July 13, maximum 5-minute rate, 4.44 inches per hour; total precipitation 3.37 inches.

July 18, maximum 5-minute rate, 4.68 inches per hour; total precipitation 1.02 inches.

July 19, maximum 5-minute rate, 3.96 inches per hour; total precipitation 1.51 inches.

August 19, maximum 5-minute rate, 5.28 inches per hour; total precipitation 1.25 inches.

September 2, maximum 5-minute rate, 4.08 inches per hour; total precipitation 5.16 inches.

April 28, maximum 5-minute rate, 1.44 inches per hour; total precipitation 1.40 inches.

The rain of July 13, 1922, is reported by the United States Weather Bureau as having registered a precipitation of 2.78 inches in one hour, the greatest precipitation in a similar length of time since July 5, 1905, when 2.79 inches of rain fell in one hour. The maximum precipitation during this storm, over a 5-minute period, was at

the rate of 4.44 inches per hour. All of the above storms resulted in a large number of the sewers in the city being overcharged, flooding the streets in the low areas and causing the water to back up in the basements of many houses. The storm of April 28, 1923, while not recorded as excessive in the city west of the Anacostia River, caused considerable damage to property and the loss of two lives east of the Anacostia River; however, in neither case of loss of life was the overcharging of sewers a contributing factor.

An inspection of the interior of 27 miles of trunk sewers resulted in the discovery of the need of some minor repairs but the principal defect brought to light was the great accumulation of silt, these deposits being 33 inches deep in one sewer and in several instances 30 inches deep, this silting up of sewers being a large contributing factor to the overcharging of trunk sewers. No funds were available during the year to permit removing this silt, but during the year 1924 it is the intention to make a beginning on this work in the hopes that future appropriations will permit its continuance on a larger scale until all sewers are clear of obstruction. Lack of funds prevented a comprehensive inspection of sewers, which inspection is deemed of extreme importance in the maintenance of a sewer system.

The 17 sewage regulators, 111 sumps, and 65 tide gates required 7,857 inspections, while to maintain a sanitary condition at storm-water outlets necessitated 104 cleanings. Inverted siphon under Rock Creek in the Zoological Park was cleaned twice.

There were 1,301 complaints requiring investigation during the year, the most common being obstructed catch basins, reported 292 times, and obstructed house laterals, reported to this office as obstructed sewers. The nature of complaints were varied, being public sewers obstructed, overcharged, or foul smelling; catch basins obstructed, overcharged, broken, or foul; manhole covers broken or giving forth odors; articles lost in sewers, etc. The work of this service is now handled by one inspector, but is increasing to such an extent that an assistant will soon be required.

A total of 23,082 catch basins were cleaned during the year. This is an average of four cleanings a year for each of the basins in the District. Seven thousand seven hundred and eighty cubic yards of silt were removed from these basins and carted away. On June 30, 1923, there were 5,883 catch basins requiring cleaning. This work has increased enormously in the last 10 years, at which date basins were cleaned every 30 days. With funds available for the current year, this activity will be partly motorized, but before this force can expect to render adequate service it will be necessary to enlarge the force and completely motorize it. In addition to cleaning basins, this force during the summer months did 287 miscellaneous cleaning jobs and flushed 14,804 catch basins to prevent offensive odors.

During the year 33.6 miles of pipe sewers and 96 basin connections were cleaned and 259 cubic yards of sand, gravel, and tree roots removed from same.

One thousand one hundred and forty-nine linear feet of pipe sewers were flushed with the view of removing obstructions. In 1913 a round of the sewers was made every 30 days, while at the present time, due to the growth of the city, with the consequent increase in length of sewers, it requires four months to make a round.

The fact that 86 sewers were obstructed this year bears testimony to the lack of necessary flushing, and the only remedy that can be suggested is sufficient appropriation to permit increasing this force from six to nine men and to provide motor transportation for work north of Florida Avenue to replace the present horse-drawn equipment.

In conjunction with the removal of snow from the street surfaces, on two occasions sewer manholes were made available by detailing inspectors to prevent congestion in same. Nine hundred and twenty-two cubic yards of snow were dumped into the sewers.

SECTION OF PUMPING SERVICE ENGINEERING.

[R. S. Chapin, assistant engineer, in charge.]

This section has pursued its routine work, keeping all records of performance at the main sewage pumping station up to date. A new graphic chart showing pumpage and coal consumption by watches was initiated and posted daily in the boiler room to give the watch engineers and firemen a ready reference as to their performance in comparison with previous days and in comparison with other watches. It is believed that this chart has contributed materially in the very appreciable coal saving effected during the year.

With the limited information available, a study was made of the heat losses in the furnaces. This study indicated a probable loss of 50 per cent of the total heat in the coal, whereas a plant of this type should lose but about 35 per cent. To determine more accurately the losses, purchases were made of a CO_2 recorder, an Orsat set for analyzing the flue gases, and recording thermometers for the flue gases and feed-water lines. To reduce the above losses it is proposed to coat the exterior of the boilers with an asbestos preparation and to alter the angles of the baffles, thus increasing the heat-absorbing surfaces of tubes over the gases at their hottest point. With these changes and from a more accurate determination of the losses from the installation of the new recording instruments it is confidently anticipated that the boiler losses will be materially lessened during the coming year.

The assistant engineer in charge of this section made inspection trips to the various steam plants in the city and acquired many valuable ideas looking toward economy.

The total pumpage at the various stations during the year was as follows:

	Gallons
Main station	25,968,718,950
Poplar Point substation	721,841,890
Rock Creek substation	270,311,830
Woodridge substation	18,284,240

Eliminating Rock Creek and Woodridge substations, which deliver their discharge to the main station, the above shows a mean total daily pumpage of 73,124,816 gallons. This is about 14 per cent greater than the total water consumption of the District, attributable to infiltration of ground water and direct rainfall.

The rainfall during the past year amounted to 43.52 inches, as compared with 39.21 inches the previous year. The maximum tidal

range at the main station was 6.3 feet, 4.6 feet being recorded in a single day.

The river flow varied from a minimum of 1,263 second-feet on September 30, November 4, and December 4, 1922, to a maximum of 50,900 second-feet on April 16, 1923, with a mean flow throughout the year of 6,760 cubic feet a second.

During the 14-day period from September 4 to October 7 the mean flow was 1,492 second-feet. Assuming the population of the District to be 437,000, the large part of which contribute to the sewerage system, the dilution figure, expressed as flow in cubic feet per minute per thousand of population, becomes 205.

SECTION OF MASTER MECHANIC.

[F. K. Steele, principal steam engineer, in charge.]

The duties of this section consist in the maintenance and operation of the steam-driven main sewerage pumping station and the three electric-driven substations. In connection with the maintenance and operation of these stations this section maintains a machine shop and a blacksmith shop, and in addition to the operation force employs electricians, steamfitters, screen operators, cleaners, and general-utility men—a total force of 52.

During the year this section undertook the preparation of materials for a revised arrangement for roping Pennsylvania Avenue for parades, involving some 35,000 feet of cable and 1,200 posts.

The following equipment was thoroughly overhauled: Steam ventilating fan, two generator condenser pumps, steam drainage pump, one boiler feed water pump, shearing and cutting machine, boiler tube cleaner and pressure pump, swinger for gasoline derrick, gasoline engine on marine railway, and completed 1,717 jobs of general repair and replacement.

During the year there was purchased a Sturtevant electric fan of 24,000 cubic feet a minute capacity to replace the present steam-driven installation.

The difficulty experienced last year with rapid burning out of grate bar fingers has been greatly relieved by the installation of steam jets under the grates.

The policy of granting the operating force a day off in every 10 was continued throughout the year.

Protective gratings were installed at the open ends of Piney Branch trunk sewer and Arizona Avenue sewer and two at the Eleventh and Randolph Streets entrance to Brookland trunk sewer.

Poplar Point and Rock Creek substations were screened and a coal furnace installed in Rock Creek substation to replace the gas installation. This change will bring about a saving of $45 a month during the winter months.

The total coal consumed at the main sewerage pumping station during the fiscal year was 3,986 tons. Coal on hand July 1, 1922, 690 tons; coal received during the fiscal year, 4,738 tons; balance on hand June 30, 1923, 1,442 tons. Value of coal purchased, $38,889.23; value of coal used, $32,725.06.

Four hundred and seventy tons of débris were removed from the screens, pressed and incinerated, and 20 tons of floating débris removed from the skimming tank and incinerated.

During the fiscal year, 2,290 cubic yards of silt were removed from the sediment chamber at the main station and 114 yards from Poplar Point substation.

At the main station there are many needs in the line of replacements and betterments, but probably the most urgent need is for motor transportation for the head of the section to enable him to make more frequent and thorough inspections of the substations.

SECTION OF SHOPS AND YARDS.

[W. M. Byrnes, assistant engineer, in charge.]

The work of this section covers the care of greenhouse and lawns, the manufacture of basin tops, the field blacksmith shop, automobile repair shop, paint shop, carpenter shop, and the removal of waste from the sewerage system by water to point of disposal. It also has charge of the rolling stock and floating equipment, including marine railway, and such stock of material as it is necessary to carry in this division.

For inclusion in the sewer system, there was constructed under this section 222 catch-basin tops, with the necessary drip stones and cheek blocks, at a cost of $11.27 per basin.

The field blacksmith shop made 20 cup gauges for installation in sewers, 2,125 manhole irons at a saving of 2.75 cents each on the lowest open-market bid, did 125 repair jobs on rolling stock, reconditioned 49 basin-cleaning tanks, ironed 1 auto truck body, made repairs on 25 automobiles, and kept in condition all construction tools.

The paint shop repainted 14 pieces of rolling stock, painted 3 rowboats, 4 auto trucks, 3 scows, dredge and towboat, pipes under M and P Street bridges, and finished 212 routine jobs.

The auto repair shop put three cars in service and two out of service, rebuilt two 1-ton trucks and one 2-ton truck, assembled two engines and four rear ends, built one body for a 2-ton truck, kept 18 automobiles in repair, and did repair work on miscellaneous gasoline equipment.

At the end of the fiscal year the division was using 36 animals and 27 animal-drawn vehicles. The purchase of 8 motor vehicles, authorized under present appropriation, will replace 26 of these animals and 16 vehicles, to the great advantage of both economy and efficiency. It is very important that motorization be continued until all services which can be more economically and efficiently handled in this way have been motorized.

The carpenter shop built all construction forms for use in connection with trunk sewers built by day labor. The tugboat and four scows were repaired, a new dock adjacent to the marine railway was built, two new rowboats were built and one repaired, and all carpentry work on the new garage completed, and 183 miscellaneous jobs performed.

Rentals received on dredge, marine railway, and pumps amounted to $1,110.01, enough to keep this equipment in repair and buy material for an auxiliary towing launch. Three sections of a new garage were built to better house the motor equipment, and material purchased for a new scow.

SECTION OF UNDERGROUND CONSTRUCTION, PUBLIC SERVICE CORPORATIONS.

[A. G. Dunn, assistant engineer, in charge.]

The work assigned this section involves detailed determination of locations for new extensions of gas mains, electric, telephone, and telegraph conduits, with their accessories, as well as supervision of the work done under permits therefor, and the accurate location of all work. Application for this new construction require careful location studies, so as to avoid interference with existing and future construction, and particularly to assure economical and orderly occupation of public space along predetermined systematic lines. During construction the work is regularly inspected, compliance with the terms of the permit is insisted upon, and an accurate record of locations made from field measurements. Record sheets are prepared showing the work in detail, and the work is then plotted on record maps and recorded by card system.

The work of the year may be summarized as follows:

Permits prepared upon application		3,082
New jobs inspected and recorded		2,580
Inspections of work under construction		5,309
Gas mains laid	miles	13.88
Electric conduit laid	do	103.84
Telephone conduit laid	do	14.23
Traction conduit laid	do	.92
Manholes constructed		1,741
Houses connected with electric conduits		3,001
Houses connected with gas mains		1,676

In addition to the current work of the year, 12 new 50-foot scale maps were made and many old maps repaired.

In advance of all proposed surface work, a study is made of existing and needed conduits and mains, and where considered advisable recommendations are made to the Public Utilities Commission that the respective corporations be required to install same.

Following is a statement of the amounts charged each of the several public corporations for supervision and inspection on account of underground construction during the fiscal year:

Potomac Electric Power Co	$2,578.42
Chesapeake & Potomac Telephone Co	1,666.68
Washington Gas Light Co	1,140.06
Georgetown Gas Light Co	409.86
Capitol Traction Co	99.60
Total	5,894.62

The greatest need of this section is additional transportation, in order to make proper inspections before preparing permits and to have a vehicle ready for emergency inspections, which service is not always met under present conditions.

J. B. Gordon,
Sanitary Engineer.

The Assistant Engineer Commissioner.

REPORT OF THE MUNICIPAL GARAGE.

WASHINGTON, D. C., *August 23, 1923.*

SIR: I have the honor to submit the following report on the municipal garage for the fiscal year ended June 30, 1923:

The municipal garage was kept open at all times, night and day, for urgent and necessary transportation.

The labor and mechanical force consisted of eight men, whose duties were repairing automobiles, carrying mail from the city post office to the District Building, and driving for departments having no automobiles or drivers.

There were 44 automobiles maintained and kept in running order for the various departments of the District government. All machines were supplied with oil and gasoline and were washed by the night force, which force also acted as watchmen.

On the evening of February 27, 1923, a fire started in some oily waste in the storeroom. The blaze was confined to the storeroom alone, only a small amount of damage to the shelving and lighting system being done. Since the fire the wiring has been placed in conduits. The office and storeroom have been painted throughout.

Owing to the crowded condition of the garage, we experienced difficulty in locating the main source of the fire, and it is recommended that immediate steps be taken to relieve this congestion.

The total operating expense for the maintenance of the 44 automobiles, including gas, oil, tires, labor, and miscellaneous supplies amounts to $18,038.64, or an average of $409.96 for each car, or $0.0731 per mile. The average mileage per car was 5,902.3 miles.

The garage was constructed in 1917 for the accommodation of approximately 25 automobiles, sufficient floor space being allowed for the necessary repair work and cleaning of cars. Additional cars purchased during the last six years has increased the number of cars in the garage to 44, necessitating the storage of cars over night in the aisles. Seven of these cars are being stored at various places throughout the city, which is objectionable to the other departments housing these cars over night. Due to the crowded condition of the garage, it is very difficult for the night force to wash and supply gasoline to the cars.

C. N. EMMONS,
Superintendent Municipal Garage.
E. P. BROOKE,
In Charge.

To the ASSISTANT ENGINEER COMMISSIONER.

REPORT OF BOARD ON OILS AND LUBRICANTS.

WASHINGTON, D. C., *September 7, 1923.*

SIR: We have the honor to submit the following report as to the operations of the permanent board on oils and lubricants for the fiscal year ended June 30, 1923.

Advice solicited from all users of oils and lubricants in the District service concerning the satisfaction being received from products purchased under current contract brought favorable reports in prac-

ically all cases, showing the general approval of the products recommended by the board.

The purpose of the oil board is to solicit bids for all oils and ubricants needed by the District of Columbia Government, and to ecommend for acceptance by the commissioners the products which vill be most advantageous to the District both as to price and service equirements. Accordingly, proposals were circulated March 1, 1923, nd bids opened April 2, 1923, for furnishing and delivering oils and ubricants considered necessary to meet the needs for the fiscal year 924.

The lowest bid in each case, complying with specifications, was ecommended by the board for acceptance, except in certain intances where full explanation accompanied. Some irregular bids vere rejected. Products previously under contract and which failed vere rejected, and bids which were considered unreasonable or unsatsfactory for some specific reason were rejected and readvertised.

Bids for furnishing products during the fiscal year 1924 showed close comparison in price with those for the previous fiscal year, xcept in the case of gasoline automobile oils. These oils showed a eduction of from 5 per cent to 20 per cent over previous contract rices.

Careful consideration was given each and every bid submitted, nd the board was governed by the results of experience and use, vith the proper thought of the service requirements of the products n question.

Upon recommendation of the oil board contracts were entered into y the commissioners during the month of June, 1923, for furnishng the estimated amount of oils and lubricants needed for the fiscal ear 1924, except in a few cases where either no bids were received r contract was not deemed advisable to the best interest of the District of Columbia.

The following summary shows the approximate amounts of oils nd lubricants used during the fiscal year 1923, together with the ange of prices paid:

Kind.	Approximate amount used.	Price range.
team-engine oil	9,400 gallons	19½ to 56 cents per gallon.
as-engine oil	17,700 gallons	24½ to 65 cents per gallon.
ubricants, differential and transmission	12,400 pounds	5 to 15 cents per pound.
achine oils and grease	7,000 pounds	2¾ to 19½ cents per pound.
etroleums	24,000 gallons	10 to 11 cents per gallon.
uel oils (including gasoline)	240,000 gallons	6 to 22½ cents per gallon.
iscellaneous oils	10,000 gallons	13 to 30 cents per gallon.
iscellaneous greases	6,000 pounds	3 to 9 cents per pound.

Respectfully submitted.

J. E. Wood, *Chairman*,
J. S. Garland,
O. E. Fearn,
Permanent Board on Oils and Lubricants,
District of Columbia.

To the Engineer Commissioner.

REPORT OF BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS.

AUGUST 1, 1923.

GENTLEMEN: We have the honor to submit the following report for the year ended June 30, 1923—buildings on which action was taken in response to notices served under the act creating the Board for the Condemnation of Insanitary Buildings during the year ended June 30, 1923:

Report for year ended June 30, 1923.

	Examined.	Demolished.	Repaired.	No action necessary.	Value of repairs.
Buildings in streets	229	94	96	87	$32,775
Buildings in alleys	331	62	6	175	600
Total	550	156	102	262	33,375

Buildings acted upon since creation of board to June 30, 1923.

Buildings in streets:	
Examined	4,134
Demolished	1,873
Repaired	1,452
No action necessary	665
Value of repairs	$218,040
Total number of board meetings held during the year ended June 30, 1923	19
Number of 20-day preliminary notices served during year ended June 30, 1923	117
Number of condemnation notices served during year ended June 30, 1923	63
Number of condemnation cards affixed to buildings during year ended June 30, 1923	62
Number of condemnation notices served under sec. 16 of Building Code	65
Estimated number of tenants required to secure other living quarters through action of board for year ended June 30, 1923	1,145
Estimated number of tenants benefited by repairs for the year ended June 30, 1923	612
Estimated value of repairs required through action of board for the year ended June 30, 1923	$33,375
Estimated value or repairs required through the board from July 1st, 1917 to June 30, 1923	$247,995

A survey has been made during the year ended June 30, 1923, of all the alleys in the District on which dwellings are located. A census of the population was taken and the buildings examined and the following data obtained:

Total number of alley dwellings	2,544
Total number of alley dwellings dilapidated	247
Total number of alley dwellings vacant	68
Total number of alley inhabitants	9,198
Total number of white people	507

Total number of colored people	8,691
Approximate value of alley dwellings	$1,272,000

R. A. WHEELER,
Major, Corps of Engineers, U. S. Army,
Assistant to the Engineer Commissioner, District of Columbia.

W. C. FOWLER, M. D.,
Health Officer, District of Columbia.

JOHN P. HEALY,
Inspector of Buildings, District of Columbia,
Board for the Condemnation of Insanitary Buildings,
District of Columbia.

TO THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF THE BOARD OF EXAMINERS OF STEAM ENGINEERS.

WASHINGTON, D. C., *August 6, 1923.*

GENTLEMEN: The board of examiners of steam engineers have the honor to submit to you the report for the year ending June 30, 1923. The following table shows the work as it progressed during each month:

	Meetings held.	Applicants received.	Applicants approved.	Applicants not competent.	First class.	Second class.	Third class.	Gas fired for pressing machines.	Special class.	Steam automobiles.
1922										
July	4	14	4	10	0	0	2	1	1	0
August	4	15	8	7	0	0	4	4	0	0
September	5	33	17	16	0	0	3	10	3	1
October	4	13	7	6	0	0	1	2	4	0
November	4	24	18	6	2	1	4	6	4	1
December	5	16	7	9	0	0	1	3	3	0
1923										
January	4	17	9	8	1	1	3	2	1	1
February	4	17	12	5	3	1	6	1	1	0
March	5	33	21	12	0	3	7	9	1	1
April	4	29	16	13	0	0	8	8	0	0
May	4	32	18	14	2	1	4	6	4	1
June	5	19	6	13	0	0	1	3	2	0
	52	262	143	119	8	7	44	55	24	5

Respectfully submitted.

E. F. VERMILLION,
H. BOESCH,
Board of Examiners of Steam Engineers.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF THE WHARF COMMITTEE.

WASHINGTON, *August 30, 1923.*

SIR: The wharf committee has the honor to submit the following report for the fiscal year ended June 30, 1923:

A statement showing the water frontage under the control of the commissioners and a list of wharf property under lease as of August 1, 1923, are on file in this office.

The leases of the Washington-Colonial Beach Steamboat Co., the Mt. Vernon & Marshall Hall Steamboat Co., Johnson & Wimsatt, Capital Yacht Club, A. M. Suit, and the Cranford Paving Co. expired during the year. New leases were entered into with the same tenants in each case with the exception of A. M. Suit. Part of the property covered by this lease was turned over to the Sea Scout organization of the Boy Scouts of America, while the remainder was leased to Judge Daniel Thew Wright.

Wharf rentals are fixed by the commissioners upon the advice of the assessor as to the value of the property.

The total frontage of wharf property on the city side of the Washington Channel is 9,275 linear feet, of which slightly over one-half is under Federal jurisdiction. The frontage on Water Street between the south curb line of N Street south and Thirteenth Street west is under the control of the Commissioners of the District of Columbia and is used and occupied by the municipal fish market and wharves, the District of Columbia morgue, the harbor precinct, the District of Columbia fireboat, and the workhouse and sand wharves, all of which are municipal activities, and also by lumber merchants, wood yards, marine railways, boathouses, and various steamboat companies operating passenger and freight steamers.

The water front along the Georgetown Channel is under private control, with the exception of the termini of streets. The terminus of Thirty-first Street is leased by the Cranford Co.

Along the Anacostia River the United States Navy Yard occupies the frontage on the city side between Second and Eleventh Streets. The sewage pumping station and yard occupies the frontage between First and Second Streets. The intake of the Capitol power plant is located at the foot of First Street. The only frontage along the Anacostia River that is leased is that between the building lines of Q Street SE., where the Standard Oil Co. has a pipe line.

The total revenue from wharf rentals amounted to $34,011.38.

The surveyor, at the request of the wharf committee, has made and furnished surveys of the various parcels of wharf property under lease.

The elimination of unsightly sheds and buildings along the water front as leases expired was continued.

The wharf committee desires to call particular attention to the very attractive club house recently erected by the Capital Yacht Club immediately south of the fish market, and to the fact that the new head house in course of erection at Wharf No. 6 will provide suitable quarters for the harbor precinct and will make it possible to demolish the existing dilapidated buildings now housing that precinct.

Motorized trucking has displaced the river freight steamer as a factor in transporting commodities from the tidewater counties of Maryland and Virginia.

The wharf committee is of the opinion that the development and improvement of the water front along the Washington Channel of the Potomac River between Washington Barracks and Fourteenth Street SW. should be no longer delayed. It is obvious to anyone who has seen our water front that existing conditions are deplorable. Many of the old timber wharves and sheds are in a rotten and dilapidated condition.

A more noteworthy project than one which would give the National Capital a useful and attractive water front could not be initiated. Civic organizations, municipal officials, and others have been advocating an improvement in Washington's water front for many years, and notwithstanding the announced policy of economy in governmental expenditures it is believed that appropriations for this purpose should be made progressively each year until the project has been completed.

Municipal officials have not been unmindful of the importance of this project. Capt. John E. Wood, assistant to the engineer commissioner, has prepared a tentative plan for the development and improvement of the water front along the city side of the Washington Channel. The general features of this plan have been approved by the Commission of Fine Arts, but no doubt some revision must be made before it can be adopted as an approved project. The plan should be carefully studied by some eminent authority on harbor and water-front development and funds secured from Congress for such service.

In developing the plan preparatory to its transmission to the Chief of Engineers and to Congress for approval full recognition should be given to the interests of navigation and commerce, as well as to the esthetic viewpoint.

The municipal fish market, the new club house of the Capital Yacht Club, the structures occupied by the Norfolk & Washington Steamboat Co., the new concrete wharf and head house on Water Street between M and N Streets, the Naval Militia armory, and perhaps the wharf of the Bureau of Lighthouses, representing in all an investment of approximately $500,000, should be retained in any scheme of development.

If it be decided to construct a quay extending to the existing pierhead line and to fill in all slips, adequate provision should be made for the protection of small boats by the establishment of several small basins or indentations. Provision should also be made for one or two marine railways—one at the Capital Yacht Club and another at the foot of Ninth or Thirteenth Streets.

Ample property in public ownership is available for the widening of Water Street SW. for the establishment of a connecting boulevard or driveway between Washington Barracks and East Potomac Park by way of a new bridge at the foot of Fourteenth Street.

One part of the District of Columbia having great potentialities for park development is the section bounded by Washington Barracks, the Anacostia River, and P Street, popularly known as Buzzards Point. This property is now zoned for commercial and industrial uses, but some doubt has been expressed as to whether or not industry will ever utilize this water frontage.

Respectfully submitted.

ROLAND M. BRENNAN,
Chairman.
RUSSELL DEAN,
D. E. MCCOMB,
Wharf Committee.

To the ENGINEER COMMISSIONER.

REPORT OF SUPERINTENDENT OF THE DISTRICT BUILDING.

WASHINGTON, D. C., *August 20, 1923.*

SIR: I have the honor to submit my report on the maintenance and care of the District Building, including the operation of its various units, for the fiscal year ended June 30, 1923.

POWER PLANT.

There were consumed 2,017 tons of coal, which averaged 13.8 per cent ash. There were 537 cubic yards of ashes removed, at a cost of $267.81. The total number of kilowatt hours generated was 485,740; of this there were used for lighting 340,990, for elevators 51,150, and for motors 93,600 kilowatt hours. The pneumatic tube system was in operation 2,185 hours, the heating system 4,659 hours, the ventilating system 1,257 hours, and the cooling system 2,420 hours. Repairs made in this department included the rebuilding of two smoke-consuming arches in No. 2 and No. 4 furnaces, the rebuilding of No. 2 stoker, which included the installation of a new set of grate bars, thereby changing the grate carrier from the roller to the slide type. All stokers have now been changed from the roller to the slide type, which should double the life of the grate bars and eliminate the frequent breaking down of the stokers. Boiler blow-down valves were all equipped with new seats and disks. One new turbine head and two sets of pins and cutters for boring boiler tubes were purchased. Two new Sangamo wattmeters, one 400 and one 600 amperes, were purchased, the old ones having completely worn out. Minor repairs were made to the plumbing and to other equipment. It is recommended that a new air compressor for use in connection with our pneumatic tube system be purchased at an approximate cost of $1,200; the one now in use has been in operation for 12 years and a breakdown is possible at any moment; should this occur, it would automatically throw out of commission our entire tube system.

ELECTRICAL DEPARTMENT.

The usual routine work incident to the care of elevators and electrical equipment was performed by this department. The drum counterweight cables were renewed on 6 passenger elevators, armatures on three of the motors were repaired and rewound, 8 desk lamps were installed in various offices, 24 lighting fixtures were changed to meet the requirements of the departments, 14 fans were installed. Many of our tablet boards are practically burnt out and should be replaced with new ones; continued use of them in their present condition is dangerous. The signal system on the passenger elevators is continually in need of repair, having given 15 years of service; the approximate life of this system is 10 years. Fans are greatly needed for clearing the elevators of impure air, particularly during the summer months.

Electric current used by the various departments for other than lighting was as follows:

	Kilowatt-hours.
Police department	5,200
Health department	35,000
Electrical department	6,672
Fire-alarm headquarters	6,854

PRINT SHOP.

In this department there were 1,969,541 pieces of printed matter, 2,771 pads, and 750 calendars completed at a cost of $7,547.51 for departments of the District government. This work was done at a minimum charge, which no doubt meant quite a saving to the Government.

BLUE PRINT AND PHOTOGRAPH SHOP.

There were 88,533 square feet of blue printing completed at a cost of $1,854.32 and 404 photographs at a cost of $1,036.98. There was purchased a washer and dryer, for use in connection with our "Pease" blue print machine, at a cost of $600.

WOODWORK AND PAINT SHOP.

This department has done all general repair work in the District building, including repairs to windows, doors, locks, repainting walls and ceilings and refinishing floors; in all approximately 27 rooms were repainted during the past fiscal year.

It is again recommended that additional floor space be acquired either by building an addition to the District building or the acquisition of adjacent property in order to relieve the congestion in the offices, which are greatly handicapped for lack of space.

JOHN E. WOOD,
Captain, Corps of Engineers, United States Army,
Superintendent.

E. P. BROOKE,
Assistant Superintendent.

The COMMISSIONERS OF THE DISTRICT OF COLUMBIA
(through the Engineer Commissioner).

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DISTRICT OF COLUMBIA

THE OPERATIONS OF THE ENGINEER DEPARTMENT DISTRICT OF COLUMBIA

YEAR ENDED JUNE 30, 1924

REPORT

OF THE OPERATIONS OF THE

ENGINEER DEPARTMENT

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1924

UNDER THE DIRECTION OF

MAJOR J. F. BELL

Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1924

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ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT OF COLUMBIA

Maj. J. F. Bell, *Corps of Engineers, United States Army, Engineer Commissioner.*
Maj. R. A. Wheeler, *Corps of Engineers, United States Army, Assistant.*
Maj. W. H. Holcombe, *Corps of Engineers, United States Army, Assistant.*
Capt. John E. Wood, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONER

Zoning Commission:
Maj. R. A. Wheeler, *Executive Officer.*
Street and Alley Cleaning, Collection of Garbage, etc.:
Morris Hacker, *Supervisor.*
T. L. Costigan, *Superintendent of Street Cleaning.*
Record Division:
Roland M. Brennan, *Chief Clerk.*
Wharf Committee:
Roland M. Brennan, *Chairman.*
D. E. McComb, *Engineer of Bridges.*
H. J. R. Lohman, *Harbor Master.*
Contract Board:
Roland M. Brennan, *Chairman.*
District Building:
Capt. John E. Wood, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR WHEELER

Highways (Streets, Roads, Bridges, etc.):
C. B. Hunt, *Engineer of Highways.*
J. W. Dare, *Assistant Engineer of Highways.*
Sidewalks and alleys—
H. N. Moss, *Superintendent of Streets.*
Construction and maintenance of suburban roads—
L. R. Grabill, *Superintendent of Suburban Roads.*
Construction and care of bridges—
D. E. McComb, *Engineer of Bridges.*
Engineer Department stables—
Bart J. Lynch, *Superintendent.*
Asphalts and cements—
V. Cleaver, *Inspector of Asphalt and Cement.*
Trees and Parkings:
Clifford Lanham, *Superintendent of Trees and Parkings.*
Surveyor's Office (Including Street Extensions):
M. C. Hazen, *Surveyor.*
Building Inspection:
J. W. Oehmann, *Inspector of Buildings.*
Permits, Engineer Department—
H. M. Woodward, *Permit Clerk.*
Plumbing board—
Louis Conradis.
James S. O'Hagan.
Samuel Tapp.
Board of examiners of steam engineers—
E. F. Vermillion.
H. Boesch.
W. I. Evans.
Board for Condemnation of Insanitary Buildings:
Maj. R. A. Wheeler, *Assistant to the Engineer Commissioner.*
Dr. W. C. Fowler, *Health Officer.*
J. W. Oehmann, *Inspector of Buildings.*
Plumbing Inspection:
A. R. McGonegal, *Inspector of Plumbing.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR HOLCOMBE

Purchase of Land.
Motor Transport.
Property Maintenance and Utilization.
Automobile Board.

UNDER THE IMMEDIATE SUPERVISION OF CAPTAIN WOOD

Water Department:
J. S. Garland, *Superintendent.*
Water rates—
G. W. Wallace, *Water Registrar.*
Sewer Construction and Maintenance:
J. B. Gordon, *Sanitary Engineer.*
Electrical Department:
Warren B. Hadley, *Electrical Engineer.*
Municipal Architect:
Albert L. Harris.
Repairs to Municipal Buildings—
Henry Storey, *Superintendent of Repairs.*
Municipal Garage:
E. P. Brooke, *in charge.*
Charles N. Emmons, *Superintendent.*

EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1924

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, December 1, 1924.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats. 108), a report of the official doings of that government for the fiscal year ended June 30, 1924.

* * * * * * *

ROADWAY PAVEMENTS

The accompanying table shows the area in square yards of new roadway pavements laid and old roadway pavements resurfaced during the year, with the total in square yards and miles of the various kinds of pavements at the close of the fiscal year.

Comparative statement showing character and extent of roadway pavements

	Existing amount on June 30, 1923		New pavement laid during year (square yards)	Pavements replaced during year (square yards)	Existing amount on June 30, 1924	
	Square yards	Miles			Square yards	Miles
Sheet asphalt and coal tar	3,443,476	183.36			3,443,476	183.36
Asphalt blocks	612,205	31.11			612,205	31.11
Asphaltic surface	44,996	3.12	83,043		128,039	9.64
Durax blocks	17,968	0.57			17,968	0.57
Asphaltic or bituminous concrete:						
On concrete base	78,708	4.58			78,708	4.58
On stone base	46,206	2.47		[1] 7,297	38,909	2.16
Cement concrete	304,211	16.35	151,884		456,095	23.91
Granite block and rubble	334,605	18.35		[2] 16,643	317,962	17.47
Vitrified block	17,390	1.04			17,390	1.04
Cobble	36,374	1.52			36,374	1.52
Macadam (estimated)	1,836,226	117.76		[2] 66,400 [1] 82,728	1,687,098	108.20
Gravel and unimproved (traveled)		156.51				160.39
Gutters on asphalt streets	242,917		671		243,588	
Pavements maintained by street railways	568,034		48,773		616,807	
Gutters on asphaltic concrete streets	10,590			[1] 743	9,847	
Total	7,593,906	536.74	284,371	173,811	7,704,466	543.95

[1] Cement concrete. [2] Asphaltic surface.

The sums appropriated for expenditures during the year under this head were as follows:

For repairing old roadway pavements, including asphalt resurfacing	$550,000
For paving new roadways	573,300
For repair of suburban roads	275,000
For grading streets, alleys, and roads	35,000

The prices paid under contracts for roadway pavements during the year were as follows:

Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 6-inch concrete base:	
Class A—Natural pitch lake asphalt	$2.72
Class B—A reduced oil asphalt	2.57
Laying vitrified block with 6-inch concrete base	4.00
Laying 6-inch concrete roadway	1.81
Laying 7-inch concrete roadway	2.02

The unit cost of concrete roadway pavements was slightly less than for the preceding year. A number of main suburban roads were substantially improved by new roadway pavements, but the rapid development of suburban property was not adequately met by improvement of abutting streets.

Asphalt roadway pavements were resurfaced to an extent of a fraction only of their real needs, their deterioration being inadequately met by minor repairs. A considerable yardage of asphalt resurfacing (Bessonite) over heavily traveled macadam and a few granite block streets was laid with expectation of reduced upkeep cost in addition to improvement in the use of the streets by traffic.

Due to the increase in suburban development and garage construction the demand for alley pavements has increased until it is beyond our ability to respond. In a partial effort to meet it, sidewalk construction, which is chargeable to the same fund, has been unduly curtailed.

The repairing of cuts in pavements made by and charged to deposits of corporations and individuals aggregated over 60,000 items with a total area of over 80,000 square yards, costing about $370,000 to repair.

At the end of the year all work of construction and maintenance of pavements that was provided for had been completed except a very few items intentionally retarded.

SUBURBAN STREETS AND ROADS

The work of repairs to suburban roads consisted principally of maintenance by patching with bituminous mixture and by surface treatment. The cost of the former was about $35,000; 135,000 gallons of oil and tar were applied and about 700,000 square yards of surface was treated at about 5 cents per square yard, a substantial reduction resulting from the introduction of mixing and loading machinery. Large use was made of soft-coal cinders in addition to old street material and household ashes for surfacing the many newly opened streets. Over 21,000 cubic yards of cinders were so applied and excellent results obtained. Over 7 miles of such roadways were constructed.

MUNICIPAL ASPHALT PLANT

The District of Columbia has operated a portable municipal asphalt plant in the repair of asphalt pavements and bituminous macadam roadways for the past 13 years. During the year 1924 the plant was operated for a period of 239 days, with a total output of 206,060 cubic feet of material, or an average daily output of 862 cubic feet.

The details of the cost of the operation of the plant are contained in the report of the engineer of highways.

SIDEWALKS AND ALLEYS

The fund for paving alleys and sidewalks abutting private property amounted to $285,000, and for sidewalks abutting Government property $15,000. Cement concrete was used almost exclusively. The contract prices for sidewalks were considerably higher than in the recent past, being $2.31 per square yard for those adjacent to paved and $2.45 per square yard for those adjacent to unpaved roadways; the latter being significantly in more remote localities.

BRIDGES

The expenditure for construction and repair of bridges amounted to $36,507.75, and the appropriations for the maintenance of the Anacostia and Highway Bridges were expended practically in full.

P Street Bridge across Rock Creek was refloored.

Livingston Road Bridge over Oxen Run and Minnesota Avenue Bridge between Hunt Place and Deane Avenue were rebuilt.

The superstructure of P Street Bridge across Rock Creek was extensively repaired.

The asphalt roadway of Bennings Road Bridge across the Eastern Branch was resurfaced.

ENGINEER STABLES

This activity rendered service at a substantial saving over the cost of hired teams. About 52 head of stock were maintained.

INSPECTION OF ASPHALTS AND CEMENTS

Through this office, tests, chemical and physical, are made of materials used in street and road improvements, likewise all cements used in building and in sewer construction, fuel oils used at the municipal asphalt plant, and miscellaneous tests of any materials requiring such. Tests made during the year were: Asphalt materials, 971; oils, 12; tars, 2; sand, 115; gravel, 142; stone, 57; limestone dust, 57; cements, 9,630; representing 96,306 barrels; and miscellaneous materials, 540; total, 11,526.

Samples of asphalt tested represent 1,625 tons, 961 tons used by contractors for laying roadways and 664 tons used at municipal asphalt plant in producing paving materials.

Of the material tested there were rejected 2,155 cubic yards of sand and 2,400 cubic yards of gravel.

SURVEYOR'S OFFICE

A division of the work of this office may be made into three classes, as follows:

1. Work performed for private parties, for which fees are charged according to a regular schedule of fees prescribed by the commissioners and estimates made by the surveyor's office.

2. Work performed for the various departments of the District and Federal Government. No fees are charged for this class of work.

3. Surveys, descriptions, and reports on condemnation cases for streets, alleys, parks, etc.

The work for the past fiscal year has, on an average, been about equal to that performed during the year previous, these two years showing an increase over the years preceding them.

HIGHWAY PLAN

The appropriation of $2,000 for the purpose of marking on the ground the permanent system of highways for the District of Columbia has been used to good advantage, and many street lines have been marked at street intersections in connection with this work. Approximately 150 stone monuments were planted, and some of the prominent streets marked were: Central Avenue from Benning Road to Southern Avenue SE.; Fourteenth Street, through Walter Reed Hospital grounds; Belt Road from Chesapeake Street to Harrison Street NW.; Broad Branch Road from Rock Creek Park to the District line; and Canal Road at various points along its line.

This system of streets, known as the street-extension plan, is in accordance with a plan which was made many years ago under an act of Congress providing for the extension of streets in the District of Columbia in an orderly, comprehensive manner. This law is believed to have been one of the most important and advantageous for the proper development of real estate in a systematic manner into blocks and lots that has ever been placed upon the statute books. The plan, which is known as "The highway plan," can not be changed or amended in any manner except upon approval of a highway commission composed of the Secretary of War, the Secretary of the Interior, and the Chief of Engineers, United States Army, and all new subdivisions must conform to this plan.

SUBDIVISIONS

There has been the usual activity in subdivision work outside of the original city limits, and many subdivisions of large tracts of land have been recorded. In all these cases it is necessary to mark the corners of all blocks in the new subdivisions with substantial stone monuments, and fees collected for subdivisions include also the cost of survey work, making computations and plats, and setting corner stones.

CONDEMNATION CASES

During the past fiscal year there have been before the courts 36 condemnation cases for streets, parks, etc., and 12 alley cases. Of these 48 cases, 18 were confirmed by the court, some being dismissed and others carried over to the present fiscal year.

The total of damages awarded by the juries in the cases confirmed amounted to $139,823.15 in all—$118,020.69 for streets, parks, etc., and $21,802.46 for alleys. These figures will show the magnitude of this condemnation work.

Some difficulty has been experienced in prosecuting condemnation cases to a conclusion on account of the jurors not being able to find benefits equal to the amount of damages and court costs, as required by law, and some provisions should be made whereby such cases can be successfully carried through the courts and the cases pushed to a conclusion.

PARKS

During the past year a commission, known as the National Capital Park Commission, was created by an act of Congress, whose function it is to go into the important question of parks and determine just what areas should be acquired for parks and to take the necessary steps for their acquisition.

The surveyor's office has recently recorded a large park area donated to the District by Mr. C. C. Glover, which is known as the Glover Parkway and Children's Playground. This park comprises a large area along Foundry Branch, on both sides of Arizona Avenue, between Massachusetts Avenue and Reservoir Street NW., containing in all approximately 77½ acres.

This is a valuable donation and constitutes quite an addition to the park system of the District, and the donor, Mr. Glover, is to be commended for the public spirited and generous motives which prompted the gift of this valuable area to the District.

A number of small park areas at street intersections were acquired by the District during the past year.

During the past year a movement was started to acquire the subdivision of Reno for park, school, playground, water, and street purposes, the subdivision being ideally located for this purpose, being in the center of what is to be a great business and residential area.

This is a very old subdivision, made before the highway plan was adopted, and is out of harmony with this plan, being based on an irregular, ill-devised plan, making an objectionable subdivision. The only way it can be obliterated so that it can be developed in harmony with the surrounding territory would be to condemn the entire area, composed of about 52 acres.

Besides the advantages accruing from the elimination of this subdivision, there are other considerations which are of interest. It has an elevation of about 420 feet, and is the site of old Fort Reno, one of the old Civil War defenses, which would make it also a site of historical interest. The old fort could be restored within the park area.

Additional land is needed for the extension of a high service reservoir, and if this land is acquired it could be well utilized for this purpose. The public-school authorities also are anxious to establish a junior high school and athletic field here if it can be acquired.

A committee of prominent citizens has already indorsed this proposition.

TREES AND PARKING

The number of trees planted along the curbs on the streets in the District of Columbia at the close of the fiscal year was 104,294. One thousand and thirty-four young trees were planted in their permanent positions during the fiscal year, a net increase of 976 over the previous year.

The planting during the year had to be curtailed to some extent due to the fact that the trees in the nurseries were too small to be transplanted to the streets. The widening of Rhode Island Avenue NE. between Twenty-fourth and Twenty-eighth Streets, necessitated the change in the location of 43 elm trees on this thoroughfare.

For various reasons 1,552 trees were removed from public space during the year.

The cost of removing 1,165 trees was paid from the appropriation for the trees and parkings division, and it amounted to $4,233.16.

The cost of removing the other trees was paid from the appropriations for other departments and whole cost deposits.

Trees to the number of 9,610 were sprayed for the extermination of leaf-eating insects.

The young trees in the Fort Dupont and Poplar Point nurseries are doing very well. These sites are well stocked with those varieties that are considered best for street planting. There were 1,045 red oak, 561 white oak, 570 Norway maple, 5 sycamore maple, 62 elm, and 26 sycamore trees transplanted from the seeds beds to the nursery rows at Fort Dupont nursery.

Transplantings at the Poplar Point nursery included 798 red oak, 213 elm, 184 poplar, 162 acacia, and 114 Norway maple.

Trees trimmed during the year numbered 10,884, at a cost of $6,249.37.

The removal of weeds from the uninclosed parkings along the streets was undertaken at a cost of $2,528.67, and $177.09 was expended for the miscellaneous care of the small reservations under the control of the Commissioners of the District of Columbia. Permits to the number of 1,005 were issued affecting the grade of the parking in connection with building operations in the residential districts during the year.

It is believed that the condition of the shade trees of Washington is, generally speaking, the best that can be expected when the adverse conditions attending their growth, health, and life are considered.

COLLECTION AND DISPOSAL OF CITY REFUSE

The amount of money turned into the Treasury from grease and salvaged material totaled $302,642.54. Considering the market prices at which these products were forced to be sold, the total is very satisfactory and it constitutes a substantial sum toward the upkeep of the city.

The total expense of collecting and disposing of all the city refuse was $821,155.35, so that the net cost of this work was $518,512.81.

It is to be noted that the wage scale of laborers and mechanics was substantially increased in December of 1923, so that the unit cost of all work from December on was materially increased.

The garbage-disposal plant produced 3,607,600 pounds of grease from 75,089 tons of garbage collected, compared with a production in the previous year of 3,451,859 pounds from 80,014 tons. The expense of the reduction, including the freight charges on the raw garbage from the transfer station in Washington to the plant at Cherry Hill and capital expenditures for improvements to plant, was $167,953.70, so that this plant virtually operated at a profit of $28,665.71.

The trash plant cost to operate $95,048.71. The excess of receipts over expenditures at this plant was $6,692.87. Included in the expenditures is an item of $9,000 for the purchase of 6 acres of land adjoining this plant.

By act of Congress the commissioners were prohibited from letting any further contract for the collection and disposal of dead animals after July 1, 1923. This work, involving the collection of 34,764 dead animals, was done by the District at a gross cost of $6,886.81. Owing to a severe fire at the private rendering plant where these animals were disposed of, it was impossible to recover for sale the hides of 154 large animals which were buried at a great expense to the District and which materially increased the cost of this work.

The ashes from private householders were collected and disposed of at a cost of $131,589.11. Much of this material was used with benefit as a temporary surfacing to newly opened streets and alleys.

The amount expended for dust prevention, cleaning of streets and alleys, and the removal of snow was $392,185.86. It is to be noted that about 96,000,000 square yards more were cleaned by hand patrol during the course of the year than in the previous year. This means about 352,000 square yards more cleaned each day and is to be accounted for by reason of new pavement laid during the year.

BUILDING OPERATIONS

The estimated value of building operations during the year was $39,403,207, a decrease of $18,235,431 compared with the fiscal year 1923, which was $57,638,638. This difference was due to the fact that 1923 was an abnormally active year, owing to the feverish rush to meet the demand for houses which had existed since before the end of the war. This extraordinary demand having been satisfied, operations during 1924 reflect the normal and stable status of the District, which may be expected to continue in the years to come, the volume gradually increasing in proportion to the augmentation in population.

The number of permits was 11,446, or 745 less than the previous year. Business buildings numbered 852, a decrease of 85. New buildings totaled 3,012, or 466 under 1923. The number of apartment houses was the same, 81, while the number of dwellings receded from 2,460 to 2,079, a difference of 381.

In 1923 there were issued 2,585 conforming certificates of occupancy under the zoning regulations as against 3,205 this year, an increase of 620 in 1924. Nonconforming certificates reached 543 in 1924; in 1923 the number was 118, a difference of 425. The fees for issuance of certificates amounted to $5,600. In 1923, $3,523.50 was realized, $2,074.50 less than in 1924.

CONSTRUCTION OF MUNICIPAL BUILDINGS

During the year 17 buildings were under construction, as follows: A four-room building to replace the Smothers School, which was completed September 24, 1923; an eight-room addition to the Lovejoy School, completed October 16, 1923; an eight-room addition to the Garrison School, completed November 30, 1923; the George Bancroft School, of eight rooms, completed August 11, 1924; the Langley Junior High School, completed January 4, 1924; the Macfarland Junior High School, completed January 4, 1924; police precinct station No. 12, completed October 23, 1923; police precinct station No. 7, completed October 29, 1923; police precinct station No. 9, completed October 29, 1923; a third-story addition to the Thomson School, completed January 17, 1924; an addition to the Armstrong Manual Training School, which will be completed about January 19, 1925; an addition to the Western High School, which will be completed about February 26, 1925; the Mount Pleasant Branch Library, which will be completed about February 18, 1925; a nurses' home at the tuberculosis hospital, which will be completed September 25, 1924; a head house at the wharf leased by the Norfolk & Washington Steamboat Co., to replace the building destroyed by fire, which will be completed September 2, 1924; the Raymond School, of eight rooms, which will be completed about December 22, 1924; the Janney School, of eight rooms, which will be completed about May 22, 1925. Additions and alterations to engine house No. 16 were in progress.

Preliminary studies for the home for the feeble-minded have been made and a general program arranged.

Preliminary studies for the general layout of the Gallinger Municipal Hospital have been made, based on the advice of Doctor Goldwater. The scheme proposed retains the domestic building, for which the foundations were put in some time ago.

Besides the preparation of plans and specifications for the abovementioned buildings, plans and specifications for about 50 other pieces of work, such as heating systems in engine houses, police stations, and school buildings, and for equipment for various buildings, were prepared in this office, amounting to $145,052. The contracts entered into by this office for the fiscal year amounted to a total of $1,542,029.

REPAIRS TO MUNICIPAL BUILDINGS

All municipal buildings are kept in repair under the direction of the municipal architect. During the year only such repairs were made as would prevent further deterioration of the structures, as the continued high prices of labor and materials and the inadequacy of available funds prevented a more extensive undertaking in the repair work.

WORKHOUSE AND REFORMATORY

Good progress was made during the year in the construction work at the District workhouse and reformatory, consisting mainly in the erection of permanent buildings and the continuance of the construction of the industrial railroad. A considerable amount of repair

work was performed at both institutions. At the reformatory 14 building operations were under way during the year, consisting of 5 shops, 4 dormitories, 2 disciplinary dormitories, 1 washhouse, 1 boiler house, and 1 dining hall and kitchen. The shops, 2 dormitories, the 2 disciplinary dormitories, and the boiler house were practically completed by June 30, 1924. The balance of this construction work will be completed within a few months. The steam-heating mains have been installed in part of the tunnel system, and heat has been turned on in three of the shops.

During the year a bridge was constructed over the main highway and about 4,600 feet of track laid for the industrial railroad. Work is progressing rapidly on the construction of this road, and before winter it should be possible to haul all necessary building material over it to the new reformatory site.

DISTRICT BUILDING

The District Building consumed 2,014 tons of coal, which averaged 10.37 per cent ash; ashes totaling 577 cubic yards were removed at a cost of $288.50. The total number of kilowatt hours generated was 527,824; of this there was used for lighting 383,633; for elevators 45,110, and for motors 99,181. Repairs were made to the power plant at a total cost of $3,048. It will probably be necessary within the present fiscal year to make additional repairs to the power plant at an approximate cost of $4,000. In addition to minor repairs throughout the building the carpentry and paint shop built new partitions and counters, moved counters, refinished floors, painted walls in 33 rooms, the latter at a cost of $2,277.71, and made alterations for the convenience of many departments. The photograph shop did blue printing and photography totaling $3,456.67. Attention is again called to the congested condition of many of the departments and request that steps be taken to find office space outside the building for one or two departments to relieve this condition.

MUNICIPAL GARAGE

There were 40 automobiles maintained and kept in running order during the fiscal year ended June 30, 1924. The garage was kept open night and day for urgent and necessary transportation. All machines were washed and supplied with gasoline and oil by the night force, who also acted as watchmen. A mechanical and laboring force consisting of eight men made all necessary repairs and operated automobiles for the various departments which were without automobiles or drivers.

Operating cost for the maintenance of the 40 automobiles, including gasoline, oil, tires, labor, and miscellaneous supplies, amounted to $17,895.61, or an average of $447.48 for each car, or $0.0574 per mile.

The cost of repair parts used in the cars was $2,460.41, or an average of $61.51 for each car, or $0.0151 per mile.

Total mileage made by the automobiles amounted to 233,066 miles, or an average of 5,826.5 miles per car.

PLUMBING AND PLUMBING INSPECTION

The plumbing inspection division made 44,657 inspections during the year. About half of these were inspections of plumbing work in new buildings; about one-quarter were inspections of plumbing work in old buildings; and the balance inspections on account of complaints of insanitary plumbing, leaky roofs, and defective rain leaders. A large percentage of these complaint cases originated in other divisions of the District government.

During the year 22 warrants were obtained against unlicensed plumbers and others for violation of the plumbing regulations. These prosecutions netted a total in police-court fines of $260. No case taken to court by the plumbing division was decided adversely.

The plumbing board held 24 meetings and examined 84 applicants, of whom 12 passed and were granted master plumber's license. At the close of the year there were 259 registered plumbers and 7 registered gas fitters.

PUBLIC CONVENIENCE STATIONS

There were in operation throughout the year four convenience stations, open 18 hours daily, and during the year the attendants reported a total patronage for all stations of over 13,000,000. The cash receipts from use of pay compartments, etc., totaled $7,791.99, this being about 35 per cent of the actual cost of the operation of the stations.

INSPECTION OF STEAM BOILERS

The number of steam boilers inspected by the inspector of steam boilers during the year was 450, including 36 belonging to the District of Columbia. Ten boilers were condemned as unfit for further use. The compensation of the inspector of steam boilers is paid from fees collected from private owners of boilers. The total amount of these reported by that official was $2,250, and the expense of inspection $310, leaving a net compensation of $1,940 for the inspector.

EXAMINATION OF STEAM ENGINEERS

The board of examiners of steam engineers held 51 meetings and examined 199 applicants, of whom 107 were found competent and 92 incompetent.

STREET LIGHTING

There are 21,823 public lamps of all kinds in the avenues, streets, alleys, etc., under the jurisdiction of the Commissioners of the District of Columbia. Of these 11,519 are gas and 10,304 electric; of the gas lamps 10,820 are single-burner mantle, 310 are double-burner mantle, and 389 are small flat flame, for designation purposes; of the electric 819 are magnetite arc, 9,253 are incandescent, ranging from 60 to 600 candlepower each (91 per cent of 60 and 100), and 232 are incandescent of about 10 candlepower, for "designation."

There was a net increase during the year of 567 lamps.

The increase in aggregate candlepower of the street-lighting system under the jurisdiction of the commissioners is from approximately 1,848,300 to approximately 1,929,900, about 4.4 per cent.

The lighting of Pennsylvania Avenue, Seventeenth Street NW. to Washington Circle, was improved by the addition of 20 arc lamps, and the vicinity of Fourteenth Street and Park Road by the addition of 6 of the same type; 75 250-candlepower lamps replaced 60 and 100 candlepower lamps on Rhode Island Avenue NE.; the net increase in incandescent lamps, upward of 300, was due to extension and improvement, largely in the suburban territory. The same is true of a net increase of upward of 200 gas lamps.

The street lighting as a whole is distinctly inadequate. A comprehensive plan of material improvement has been formulated, including the design of ornamental posts of greater height, to admit of the effective use of larger lighting units to produce much improved lighting at relatively less added cost. An application of the plan on small scale is about to be made.

The situation with respect to the several suits at law against certain railway companies for recovery of sums expended in mintaining lights adjacent to their respective rights of way remains essentially as stated in 1920 and succeeding reports, with accretion of sums claimed.

SIGNAL SYSTEMS—FIRE-ALARM TELEGRAPH, POLICE-PATROL SIGNAL, AND TELEPHONE SERVICE

There were 806 fire-alarm boxes in service at the end of the year, 690 on underground and 116 on overhead wires, a net increase of 24 over the preceding year; 2,670 box and local fire alarms (exclusive of "additional" alarms) were received and transmitted during the year, of which 278 were false alarms. The number of box circuits in commission was increased by 4, to 39, and redistribution made, further relieving overloaded circuits.

There were 489 police-patrol boxes in service at the end of the year, 390 on underground and 99 on overhead wires, a decrease of 1 compared with the preceding year; 2 were added, 3 discontinued, and 62 were changed as to station connection, by reason of the institution of twelfth precinct and incident change of boundaries of other precincts.

There were 1,625 telephones connected to the District system at the end of the year, and 28 in use as portable sets by fire and electrical departments, an increase of 75 in the year.

There were 2,692 cells of storage battery in service on fire-alarm, police-patrol, and local circuits at the end of the year, an increase of 518, due to increase in number of fire-alarm circuits.

There were in service in the composite signals system (fire-alarm, police, and telephone) on June 30, 1924, a grand total of 7,436 miles of conductor, of which 7,344 miles were underground and 92 miles overhead. Reserve capacity of cable is below requirement of demand and below safe emergency provision. Provision for expansion is again presented as an urgent requirement.

ELECTRICAL INSPECTION

The total number of permits issued for installation of wires and apparatus for electric light, heat, and power purposes, on private

premises, not including plants of public service companies, during the year, was 9,495, representing approximately 16,868 kilowatts capacity of utilization equipment, compared with 9,791 permits representing 9,271 kilowatts in the preceding year. The total sum of fees paid for permits was $16,264, compared with $16,164. The annual increase of service to be rendered continues, and neither adequate nor satisfactory service can be rendered with the number of inspectors engaged.

Supervision was exercised over the erection, taking down, and moving of poles, and of the stringing of overhead wires, in streets and other public spaces. The total of recorded wire-supporting poles in the District at the end of the year was 23,056, a net increase of 1,097, compared with 1,054 and 912 in the next two preceding years, indicative of continuance of activity in suburban development. There has been an increase of 3 in the number of telephone poles in streets and avenues within the "prescribed area" of the act of Congress regulating the use of telephone wires.

MISCELLANEOUS

The electrical department has cooperated with the municipal architect and other District officers, consulting and counseling, preparing plans, specifications, and estimates, and supervising electrical work in municipal properties.

HARBOR FRONT

The actual water frontage of the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water front is 18 miles, of which about 8 miles is set aside for parks and for other purposes of the United States. The largest amount of wharf property under the control of the commissioners is along the Washington Channel.

The new harbor police station and dock, the dock of the fire boat, the District morgue, the municipal fish wharves and market, and the District workhouse and sand wharves are located on the Washington Channel between N and Thirteenth Streets. The balance of the frontage is leased by steamboat companies, boathouses, lumber dealers, etc.

A fire occurred at the wharf of the Norfolk & Washington Steamboat Co. in January, 1924, damaging the wharf property to the extent of about $56,000. The wharf has since been rebuilt. Steel sheds have been erected in place of the wooden structures, a one-story head house of semifireproof material has been erected, and the decking of the wharf has been surfaced with a layer of asphalt on metal lathe. With these precautions, it is hoped that there will be no repetition of the disastrous fires which have occurred at this wharf.

The permanent development and improvement of the water front along the Washington Channel between Washington Barracks and Fourteenth Street SW. is a matter which should be given very serious consideration.

SEWERAGE AND SEWAGE-DISPOSAL SYSTEMS

The construction and maintenance of the sewerage system and the sewage-disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer.

The length of main and pipe sewers constructed during the year was 15.25 miles. The total length of main and pipe sewers on June 30, 1924, was 791.23 miles, of which 156.04 miles are main sewers and 635.19 miles are pipe sewers. In addition to the above new sewer work, 101 storm-water catch basins were constructed during the year, bringing the total number to 5,984.

There was expended during the year on new extensions of the sewerage system the sum of $630,062.01, and on the sewage-disposal system $40,000. The total cost of the sewerage system to June 30, 1924, was $16,432,298.47, and of the sewage-disposal system to the same date was $6,015,232.96, making a total cost of the complete system to June 30, 1924, of $22,447,531.43.

The main sewerage pumping station and the three substations were in continuous operation throughout the year handling the sewage of practically the entire District. In addition, the main station pumped storm water from the 900-acre low-level area flanking Pennsylvania Avenue between the Peace Monument and Fifteenth Street. At the main station the combined pumpage of sewage and storm water amounted to 25,238,327,500 gallons during the year. The Poplar Point substation pumped 739,918,571 gallons, the Rock Creek substation 448,596,000 gallons, and Woodridge substation 18,820,757 gallons of sewage during the year. Eliminating the Rock Creek and Woodridge substations, which deliver their discharge to the main station, the above would indicate a mean daily pumpage of 71,173,277 gallons. The coal consumption at the main station during the year was 4,013.36 tons, of which about 8 per cent should be charged off to cover bunker loss, use by incinerator, and other miscellaneous uses.

On June 3, 1924, an agreement was formally entered into between the Commissioners of the District of Columbia and the Washington Suburban Sanitary Commission as to a reciprocal provision for the connection of the sewerage systems in the State of Maryland bordering the District of Columbia and those of the District of Columbia. This agreement was in accordance with act of Congress approved September 1, 1916. No sewage connections to or from Maryland have as yet been made under this agreement.

Under the 1919 District appropriation bill there was appropriated the sum of $60,000 for the purchase or condemnation of the necessary land for a sewage-treatment works. The site selected for these works is a portion of the Bellevue tract in the vicinity of the Home for the Aged and Infirm. During the fiscal year 1919, 34.6 acres of land was acquired, and after long court delays there was finally consummated during the fiscal year 1924 the purchase of two additional parcels of land aggregating 33.18 acres. The sum paid for these two latter tracts was $29,147.52. It is felt that continued efforts should be made to acquire the 10-acre parcel 253/2, as well as reach an agreement with the Baltimore & Ohio Railroad to have them relocate their trackage now traversing District property recently acquired for these sewage-treatment purposes. The time can

not be far distant when some preliminary treatment must be given the sewage of Washington, rather than discharge it, as at present, in its raw state into the Potomac River.

As the result of a more liberal appropriation, the division was better able to meet the demand for service sewers than during the year 1923, although the demand for this class of sewers is still considerably greater than the available appropriations will permit constructing. At the close of 1924 the service sewers ordered and not built amounted to $115,304. The appropriations made available for interceptors of the sewage-disposal system are, it is felt, still decidedly inadequate.

There has been prepared in the office of the sanitary engineer a tentative five-year construction program, with the view of striving to bring the sewerage system of the District to date by June 30, 1929. Under this program there would be required an annual construction appropriation during the next four years of approximately $1,800,000. In comparison with these needs, it might be mentioned that the construction appropriations for the fiscal year 1925 are but $805,000. The above-estimated needs for sewer construction are in addition to any sums which might be required in this period for a sewage-treatment plant.

WATER MAINS

During the year 75,611 feet, or 14.30 miles, of water mains were laid, a decrease of 1.6 miles over length laid last year, making the total length of mains now in service 688 miles, at an aggregate cost of $5,117,239.61, paid from water department funds.

WATER CONSUMPTION

The mean daily consumption for the fiscal year was 64,069,344 gallons, giving a mean daily per capita consumption of 131.57 gallons, estimated on a population of 487,000.

The total pumpage for the year was 12,300,606,110 gallons.

The total coal burned was 8,187 tons.

The cost of operating pumps for the year was $123,878.31, as against $115,748.16 for fiscal year 1923; thus making the cost of pumping 1,000,000 gallons of water into the mains $10.01, as against $9.58 for the preceding year, due to the increased cost of labor.

Underground leakage found and stopped during the fiscal year aggregated a saving of 88,230 gallons daily.

The financial statement of water revenues and expenditures will be found in the report of the auditor.

WATER METERS

During the year 2,653 new meters were installed, and 70,181, or 87.41 per cent of the total, water services are now metered.

Very respectfully,

CUNO H. RUDOLPH,
JAMES F. OYSTER,
J. F. BELL,
Commissioners of the District of Columbia.

REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA

REPORT OF ENGINEER OF HIGHWAYS

WASHINGTON, D. C., *August 1, 1924.*

SIR: I have the honor to submit the following report of the operations of the engineer of highways for the fiscal year ended June 30, 1924.

The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the highway division aggregated $2,186,614.66, of which $285,000 was for paving sidewalks and alleys in all parts of the District; $573,300 for paving new roadways; $550,000 for repairing old roadway pavements, including asphalt resurfacing; $275,000 for repair of suburban roads; $30,000 for construction and repair of bridges and viaducts; $35,000 for grading streets and avenues; $15,000 for sidewalks and curbs around Government reservations, buildings, and parks; $50,000 for paving roadways under the permit system; while $373,314.66 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

Summary of work under appropriation for improvement and repairs for year ending June 30, 1924

Asphalt surface pavements (blanket treatment)	square yards	83,043.00
Vitrified block gutter	do	670.67
Cement concrete roadway pavements	do	151,866.00
Old cobble and granite block removed	do	6,271.30
Granite and bluestone set	linear feet	9,062.65
Cement curb formed and laid	do	66,750.09
Grading	cubic yards	80,953.85
Cement concrete sidewalks (assessment and permit work)	square yards	29,528.19
Cement concrete sidewalks (around Government reservations)	square yards	8,774.54
Cement concrete alleys (assessment and permit work)	do	49,476.00

The following is the list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1924.
Tables B and C.—Statement of character and extent of street pavements.
Table E.—Street improvements.
Table F.—Repairs to asphalt and coal-tar pavements.
Table G.—Work done for street railway companies.
Table H.—Work done by day labor under appropriation for "Repairs to streets, avenues, and alleys."
Table I.—Regular permit work.
Table K.—Assessment work.
Table L.—Replacing and repairing sidewalks and curbs around public reservations.
Table M.—Miscellaneous work.
Table N.—Whole-cost work.
Table O.—Repairs to cuts by plumbers and others.
Table P.—Grading streets, alleys, and roads.

Of the above tables, B, C, and O are printed herewith. The remaining tables are on file in the record room of the office of the engineer of highways, plan case No. B–1162.

The unit cost of roadway pavements for the year was about the same as for the preceding year, while that of sidewalks advanced. Labor costs increased somewhat. A feature of the year's paving program, made possible by special provisions of funds, was the improvement of a number of the main suburban roads with new concrete pavements 7 inches thick designed to be covered with an asphalt wearing surface when conditions under service so dictate. The continued development of new streets by builders, responsive to the building shortage, more than kept pace with the rather modest progress that could be made in paving this class of entirely unpaved roadways.

The fund of $50,000 provided for paving roadways on deposit in advance of the half cost of the work was expended to the practical limit. Very little resurfacing of asphalt roadways was accomplished during the year for lack of funds and the average age of all these pavements is now believed to be far beyond that of any other municipality; a condition reflected, notwithstanding our special efforts to the contrary, by a progressive deterioration in the safety and comfort of their use. More liberal funds for this resurfacing are plainly needed. The use of Bessonite, especially on well-formed and well-traveled macadam roadways, was further developed to the extent of over 80,000 square yards laid during the year with immediate improvement in traffic conditions and confidently expected reduction in future upkeep costs.

In past years the demands for the paving of alleys was customarily subordinate to those for sidewalks, both being chargeable to the same fund, but due to the very great increase in suburban development and in alley garages the reversal of this relationship has occurred, and requests for alley pavements are far in excess of our ability to respond thereto. An increase in the fund for this class of work would be directly responsive to community needs that have been specifically expresed and are continuing to grow.

At the end of the year all work provided for by appropriations had been completed except a very few items intentionally retarded under a resurfacing and a general sidewalk contract and a single square of roadway pavement which was necessarily delayed by underground installations.

The extent of repairs made to pavements disturbed by corporations, individuals, and other agencies at the cost of these agencies was practically the same as for the preceding year, and is reflected in the amount expended, about $370,000, and the number of individual items of repair, over 60,000. Every type of pavement on our streets is included in the areas repaired and the revolving fund involved (operating account, streets) is maintained in a thoroughly solvent state by an addition of 5 per cent overhead to the actual labor and material costs of the work.

MUNICIPAL ASPHALT PLANT

The total output of the municipal asphalt plant for the year was 206,060 cubic feet of material, consisting of 155,280 cubic feet of old

material mixture and 50,780 cubic feet of topping mixture. The plant was operated for 239 days, with an average daily output of 862 cubic feet. In connection with the output of the plant, the crusher was operated for 62 days during the year and 4,136 cubic yards of old material hauled to the plant from various streets was crushed.

Constant attention is given to the maintenance of both the plant and the crusher, repairs being made and parts replaced when necessary, thereby keeping them in the best operating condition possible. This cost is incorporated in the total cost of output shown below.

The following material in amounts set forth below were purchased for use in manufacturing the output during the year:

Limestone dust, 162 tons, cost average	$5.05
Sand, 4,256.75 cubic yards, cost average	1.46
Asphaltic cement, 654.69 tons, cost average	19.30

There were purchased for use in operating the crusher and mixer the following large items:

Fuel oil, 45,241 gallons, cost average	$0.05
Coal, 195 tons, cost average	7.43
Wood, 125 cords, cost average	15.92

The cost of operation, including labor and material, are kept from day to day, and the summary of this data for the fiscal year develops the following unit costs for the year's operation:

Operation of crusher

(Period of operation, 62 working days; output of crusher, 4,136 cubic yards)

Cost of crushed product per cubic yard:	
Labor and fuel	$1.41
Maintenance, renewals, and repairs	.14
Overhead cost: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
Total cost	1.55

Operation of plant

(Period of operation, 239 days; total output, 206,060 cubic feet)

	Cents
Total manufacturing cost per cubic foot:	
Labor	8.32
Fuel oil	1.02
Coal	.60
Wood	.46
Total cost	10.40
Haul from plant to street: Labor	7.83
On street:	
Labor	27.00
Painting joints	.46
Fuel	.36
Total cost	27.82
Maintenance and repairs:	
At plant	.84
On street	.13
Total	.97

Overhead: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

	Cents
Supervision, per cubic foot: Foreman and overseers	5.07
Total manufacturing cost per cubic foot:	
Plant labor	10.40
Hot haul	7.83
Street work	27.82
Maintenance of plant and tools	.97
Supervision	5.07
Total	52.09

The sand used was bought under contract at 80 cents per cubic yard and hauled from the wharf to the plant at the cost of $2,796.54 for 4,256.75 cubic yards, or $0.66 per cubic yard, a total of $1.46 per cubic yard. All other expendable material was delivered at the plant site at the cost thereof used herein.

The cost of a cubic foot of old material from the above was as follows:

0.65 cubic foot of old material, at $1.55 per cubic yard	$0.0373
0.35 cubic foot sand, at $0.80 per cubic yard; hauled, $0.66 per cubic yard	.0189
3.33 pounds limestone dust, at $5.05 per ton	.0084
5.04 pounds asphaltic cement, at $19.38 per ton	.0488
Cost of material	.1134
Manufacturing and placing cost	.5209
Total cost per cubic foot	.6343

Topping mixture:	
1 cubic foot of sand, at $0.80 per cubic yard; hauled, $0.66 per cubic yard	.0541
4.20 pounds limestone dust, at $5.05 per ton	.0106
10.08 pounds asphaltic cement, at $19.38 per ton	.0976
Cost of material	.1623
Manufacturing and placing cost	.5209
Total cost per cubic foot	.6832

The total cost of minor repairs to sheet asphalt and asphaltic concrete pavements during the year, the same representing the maintenance cost during the year, was $68,287.50. This cost represented the maintenance of all asphalt and asphaltic concrete streets not under guaranty by contractors, a total yardage of 3,613,386. The cost per square yard per year was therefore about 1.89 cents.

For purposes of record and comparison the like annual costs are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 cents; 1919, 3.07 cents; 1920, 3.38 cents; 1921, 3.75 cents; 1922, 2.69 cents; 1923, 2.22 cents.

The municipal asphalt plant began operations in 1912, repairs being made by contract during the first quarter of that year, and with the asphalt plant during the last three quarters of that year and continuously since. The marked reduction for the year 1917 is affected very significantly by the law effective that year by which

repairs to pavements over one year old are chargeable to repair appropriations instead of being paid for by the paving contractors under a five-year guaranty, as formerly. The yardage of pavement over which our repairs were distributed was thus increased by nearly 700,000 square yards, on which practically no expenditures were needed, as the pavements were only from one to five years old.

In connection with these costs of annual repair it should be considered that some of the streets approximate an age of 40 years and that the average age of those we have resurfaced in recent past years exceeds 25 years. The average age of streets resurfaced in 1910 was 25.8 years; in 1911, was 24.5 years; in 1912, was 25.8 years; in 1913, was 26 years; in 1914, was 28.5 years; in 1915, was 28 years; in 1916, was 29.6 years; in 1917, was 27 years; in 1918, was 26 years; in 1919, was 26.7 years; in 1920, was 23.6 years; in 1921, was 23.2 years; in 1922, was 28.7 years; there was no resurfacing done in 1923 and very little in 1924.

STREETS

Repairs to streets, avenues, and alleys, appropriation 1924, were made under the immediate supervision of the superintendent of streets, as follows:

Brick sidewalk relaid	square yards	14,314
Asphalt block paved	do	628
Asphalt block repaved	do	10,174
Vitrified block paved	do	1,741
Vitrified block repaved	do	5,860
Curb reset	linear feet	447
Granite block laid	square yards	3,422
Cement walk relaid	do	8,405
Grading	cubic yards	4,218
Labor		$113,935.04
Material		$11,927.49

SUBURBAN ROADS

The following items of the District appropriations for 1924 were expended principally under the direction of the superintendent of roads, viz:

Repairs to suburban roads	$275,000
Grading streets, alleys, and roads	35,000
Paving roadways, permit system	50,000

In addition to the above amounts, $50,000 additional was expended under this office from the appropriation for repairs to streets and for repairs to cuts and other work which was paid for by the deposit of funds by individuals.

The work under the appropriation for repairs to surburban roads consisted principally of maintenance of the existing roads by patching with bituminous mixture and by surface treatment. The cost of surface treatments was $34,362.87; 135,000 gallons of oil and tar were applied, and about 700,000 square yards of roadway were treated at a cost of about 5 cents per square yard.

The cost of bituminous patching has been considerably reduced by the installation of machinery for mixing and loading. The cost of

1 ton of bituminous material mixed for cold patching has been found to be as follows:

Stone at the yard	$2.25
Bituminous material, 10 gallons	1.20
Labor for mixing	.60
Cost per ton at mixer	4.05

This is equivalent to a cost of about 20 cents per cubic foot, which will cover about 12 square feet of average surface.

The very large extent of building operations throughout the District during the year made it necessary to use a considerable part of the appropriation for repairs to roads for surfacing in a temporary manner newly opened squares which were built upon during the year and for which no other fund was available. Such temporary surfaces aggregate 7.21 miles, a length much greater than that of the permanent pavements laid in the suburban area during the year on streets of similar character. This work required 21,116 cubic yards of soft coal cinders in addition to old street material, ashes from city collections, etc. It has been found that ashes from house collections, where no better material is available and when properly regulated, rolled, and oiled, form an excellent and cheap temporary roadway material. Such a surface was built on Webster Street NW., from Second Street to New Hampshire Avenue, a distance of three squares, in a solidly built residence section, at a cost of about 40 cents per square yard, or 85 cents per linear foot of street, exclusive of curbs and gutters. The ashes were delivered by the street cleaning division at the work free of charge. The surface was later regulated and oiled at a cost of about 5 cents per square yard, or 11 cents per linear foot of street; making the total cost about 45 cents per square yard, or less than $1 per linear foot, for 1,100 feet of street. It is expected that this roadway with a normal amount of maintenance will last until an appropriation for paving can be obtained and a new pavement laid. In this case cement curbs and gutters had been constructed under the permit system.

The experimental use of a blanket of sheet asphalt laid on top of macadam roadways as a base, which was begun last year on several suburban roads, was continued. Where conditions as to the roadway crown permit this gives a very satisfactory and durable surface, except under most severe conditions of heavy traffic. Such surfaces were placed on parts of Cedar Street NW., Rittenhouse Street, Western Avenue, New Cut Road, and Little Falls Road. Where used, this treatment has diminished the maintenance cost, and it is recommended that this method of treatment of macadam roads be continued in cases where it is practicable to do so.

In addition to the grading paid for by the District from the grading appropriation of $35,000, a very much larger amount of street and alley grading was done by private individuals under permits, this being the practice where large tracts are being graded for building or for speculative purposes.

The extension of the pavements on the trunk highways toward the District line, under special appropriations, advanced rapidly during the year. Connecticut Avenue and Rhode Island Avenue were completed; Bladenburg Road was finished to South Dakota Avenue, and

Nichols Avenue was paved to Portland Street. These pavements would considerably decrease the amount expended for maintenance on suburban roads and streets if an almost equal area of previously unimproved streets had not been added by new developments.

Some of the cement roadway pavements, both of those built several years ago and some of those built more recently, where heavy traffic occurs, are showing the need for extensive repairs. Such repairs are necessarily costly, and it is believed that a blanket coat of asphalt should be applied upon the surface of the concrete in all such cases before the disintegration proceeds too far. This blanket coat is now provided for by an added depth of the curb of 1½ inches. Where such blanket coats have been applied, even on pavements which had been badly cracked, the result has been very satisfactory.

BRIDGES

The expenditures from the appropriation for the construction and repair of bridges amounted to $36,507.75, and the unexpended balance was $35.95.

The principal items of work were:

P Street Bridge, over Rock Creek, refloor	$1,830.54
Pennsylvania Avenue Bridge, over the Eastern Branch, refloor sidewalks	1,400.42
Livingston Road Bridge, over Oxen Run, rebuild	5,136.09
Normanstone Drive culvert, rebuild	801.21
Dangerous holes and minor repairs	3,080.45
Salaries	5,756.03
Lumber	2,697.38
Construction materials, other than lumber	1,172.27
Minnesota Avenue Bridge, between Hunt Place and Deane Avenue	4,272.80
Q Street Bridge, over Rock Creek, repairs to superstructure	8,600.76
Kenilworth Avenue culvert, north of Bennings Road, rebuilt at charge to this fund of	966.75
Bennings Road Bridge, over the Eastern Branch, resurface	3,251.28

The appropriations for Anacostia Bridge and for Highway Bridge were expended practically in full.

The engineer stables, housing 46 horses and 6 mules, are located at U Street NW. between Sixteenth and Seventeenth Streets, and First and Canal Streets SW. The animals are assigned to the various departments as follows:

Sewer division	15
Repair shop	14
Repairs to cuts	15
Sealer of weights and measures	1
Electrical department	1
Extra horses	6
	52

Number of annual employees: One superintendent, one blacksmith, two drivers, two watchmen.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

C. B. Hunt,
Engineer of Highways.

To the Assistant Engineer Commissioner.

TABLES B and C.—*Character and extent of roadway pavements July 1, 192[illegible]*

SQUARE YARDS

Section	Asphalt	Asphaltic surface	Asphalt block	Asphaltic concrete, concrete base	Asphaltic concrete, stone base	Cement concrete	Durax block (small granite block)	Granite and rubble
Northwest	1,819,241	5,335	25,323	9,674	6,372	20,999	12,294	91,202
Northeast	415,575	----------	193,962	3,127	----------	11,825	----------	17,[illegible]
Southeast	262,954	----------	238,437	8,019	4,082	2,509	----------	37,[illegible]
Southwest	286,102	13,264	40,436	13,535	----------	11,148	----------	136,[illegible]
Georgetown	156,171	----------	23,076	4,144	905	----------	5,674	20,[illegible]
Northwest suburban	391,975	65,562	84,046	25,855	24,501	291,695	----------	4,014
Northeast suburban	90,255	8,346	6,925	14,354	----------	96,397	----------	----------
Southeast suburban	21,203	35,532	----------	----------	3,049	21,522	----------	1,[illegible]
Total	3,443,476	128,039	612,205	78,708	38,909	456,095	17,968	317,[illegible]

Section	Vitrified block	Cobble	Macadam (estimated)	Gutters on asphaltic streets	Gutters on asphaltic concrete streets	Pavements maintained by street railroads	Total
Northwest	9,855	5,763	20,939	119,662	1,128	287,110	2,434,[illegible]
Northeast	3,882	----------	30,416	32,955	231	69,316	778,[illegible]
Southeast	----------	13,122	45,465	18,316	898	48,328	679,[illegible]
Southwest	3,138	7,070	10,136	24,527	1,254	56,820	603,[illegible]
Georgetown	515	10,419	3,000	5,979	498	35,325	276,[illegible]
Northwest suburban	----------	----------	1,230,693	29,381	4,517	79,771	2,232,[illegible]
Northeast suburban	----------	----------	316,908	6,383	1,049	25,356	565,[illegible]
Southeast suburban	----------	----------	29,541	6,385	272	14,781	133,[illegible]
Total	17,390	36,374	1,687,098	243,588	9,847	616,807	7,704,[illegible]

MILEAGE

Section	Asphalt	Ashpaltic surface	Asphalt block	Asphaltic concrete, concrete base	Asphaltic concrete, stone base	Cement concrete	Durax block (small granite block)
Northwest	93.52	0.34	1.57	0.51	0.24	1.15	0.30
Northeast	21.77	----------	8.58	.19	----------	.80	----------
Southeast	13.93	----------	11.93	.43	.17	.16	----------
Southwest	15.51	.66	2.37	.68	----------	.36	----------
Georgetown	9.30	----------	1.51	.49	.06	----------	.27
Northwest suburban	21.86	5.09	4.52	1.31	1.48	15.54	----------
Northeast suburban	5.64	.63	.63	.97	----------	4.84	----------
Southeast suburban	1.83	2.92	----------	----------	.21	1.06	----------
Total	183.36	9.64	31.11	4.58	2.16	23.91	.57

Section	Granite and rubble	Vitrified block	Cobble	Macadam (estimated)	Gravel and unimproved (estimated)	Total
Northwest	5.11	.50	.08	.90	2.54	106.76
Northeast	.87	.24	----------	1.60	4.02	38.07
Southeast	2.14	----------	.66	2.15	6.33	37.90
Southwest	7.09	.27	.30	.49	2.62	30.55
Georgetown	2.12	.03	.48	.06	.76	15.08
Northwest suburban	.10	----------	----------	76.66	58.40	184.96
Northeast suburban	----------	----------	----------	24.12	48.85	85.68
Southeast suburban	.04	----------	----------	2.22	36.87	45.15
Total	17.47	1.04	1.52	108.20	160.39	543.95

TABLE O.—*Number of square yards and cost of repairs to cuts in various streets, sidewalks, and alleys during the fiscal year ending June 30, 1924, chargeable to plumbers, public-service corporations, individual depositors, and appropriations of the District and Federal Governments*

Repairs charged to—	Flat rate	Whole cost	Total
lumbers	$20,416.51		$20,416.51
ublic-service corporations	65,349.60	$154,377.07	219,726.67
ndividual depositors	28,180.61		28,180.61
arious appropriations of the District and Federal Governments	53,811.79	51,179.08	104,990.87
Total	167,758.51	205,556.15	373,314.66

Repairs made to—	Flat rate	Whole cost
quare yards:		
Sheet asphalt	$5,374.55	$10,869.22
Vitrified block	867.05	3,008.71
Asphalt block	1,474.66	6,682.37
Granite block	605.23	7,421.53
Cobble	139.66	449.26
Cement sidewalks	17,246.37	
Macadam	2,157.70	752.96
Concrete roadways	6,643.81	194.65
Scoria	21.63	1,077.09
Durax	18.87	1,876.90
Brick sidewalks	4,350.78	9,766.14
Total	38,900.31	42,098.83

REPORT OF THE INSPECTOR OF ASPHALTS AND CEMENTS

WASHINGTON, D. C., *August 20, 1924.*

SIR: I have the honor to submit the following report of operations of this division during the fiscal year ending June 30, 1924.

Total number of samples tested 11,526, records of each on file in office.

ASPHALT PAVEMENTS

There were laid by the Cranford Co. approximately 83,043 square yards of asphalt concrete sand topping mixture (Bessonite), this in resurfacing old macadam and granite-block roadways.

This is the third year Bessonite has been used by the District. All laid has thus far stood up well under traffic and is giving satisfactory service.

CONCRETE ROADWAYS

There were also laid by contractors 151,884 square yards of concrete roadways. The aggregate was plant proportioned in batches and mixed on site of work. Results of compression tests show a maximum of 2,628.75 and a minimum of 1,581.30, with a general average of 2,073.35 pounds per square inch.

PORTLAND CEMENT

Number of samples tested, 9,630, representing 96,306 barrels, all of which complied with specifications.

Nine tables showing in detail materials tested, results thereof, and by whom submitted are on file in this office.

Very respectfully,

V. CLEAVER,
Inspector of Asphalts and Cements.

The ENGINEER OF HIGHWAYS.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS

WASHINGTON, D. C., *August 20, 1924.*

SIR: I have the honor to submit my annual report dealing with the operations of the trees and parkings division for the fiscal year ended June 30, 1924.

TREES PLANTED

Young trees to the number of 1,034 were planted in their permanent positions on the streets during the fiscal year, a net increase of 976 over the previous year. Trees were planted on both sides of Cleveland Avenue NW. between Cathedral Avenue and Thirty-fourth Streets; both sides of Klingle Road NW. between Thirty-second and Thirty-fourth Streets; south side of Woodley Road NW. between Klingle Road and Thirty-fourth Street; east side of Thirty-fourth Street NW. between Cleveland Avenue and Woodley Road; west side of Thirty-third Place NW. between Woodley Road and Lowell Street; west side of Thirty-second Street NW. between Woodland Drive and Garfield Street; south side of Garfield Street NW. between Thirty-second Street and Woodland Drive; northeast side of Woodland Drive NW. between Thirty-second and Garfield Streets; around Grant Circle; both sides of Thirteenth Street NW. between Hamilton and Ingraham Streets; both sides of Varnum Street NW. between Sixteenth and Seventeenth Streets; both sides of Ingraham Street NW. between Thirteenth and Fourteenth Streets; south side of Water Street SW. between Seventh and Ninth Streets; and the west side of Water Street SW. between L and M Streets to extend the existing lines into the suburbs and hitherto unplanted localities. Trees were planted on both sides of T Streets NW. between Twelfth and Fourteenth Streets; north side of T Street NW. between Fourteenth and Sixteenth Streets; and both sides of P Street NW. between Sixth and Seventh Streets to replace those removed some time ago because of street improvements.

The majority of the trees was planted for the purpose of filling vacancies in existing rows.

The locations of 43 elm trees were changed on Rhode Island Avenue NE. between Twenty-fourth and Twenty-eighth Streets, because they interfered with the widening of this thoroughfare.

The planting of trees during the year had to be curtailed to some extent due to the fact that the trees in the nurseries were too small to be transplanted to the streets.

The cost of planting 851 trees was paid from the appropriation for the trees and parkings division; 53 from the appropriation for other departments, and 130 from whole cost deposits. These trees were planted at the curb line.

TREES REMOVED

A total of 1,552 trees were removed during the year for various reasons. Of these, 287 were decayed and dangerous; 1 was of a condemned variety; 2, to relieve excessive shade; 6, interference with parking improvements; 336, street improvements; 59, for driveways; 10, improvements of alleys; 36, destroyed by automobiles; 101, storms; 8, interference with entrance to buildings; 10, close proximity to buildings; 32, interference with building operations; 2, injurious to curb trees; 2, interfered with the location of street lamps; 1, interfered with vault construction; and 3, interfered with construction of sewer. It was ascertained that 34 trees were destroyed by illuminating gas; 13, salt water; 27, abnormal moisture supply; 17, by being filled around; 14, by being girdled; 192, by drought; 3, by insects; 20, by root mutilation; 1, by oil; 15, by horse bite; and the deaths of 320 were unexplained.

Of the total number removed, 1,333 stood at the curb line, 150 in the parking, 34 in the sidewalk, 18 in alleys, 15 in roadways, and 2 on private property.

The cost of removing 1,165 trees was paid from the appropriation for the trees and parkings division, 236 from the appropriations for other departments, and 151 from whole cost deposits. The cost of removing the trees paid from the appropriation for the trees and parkings division amounted to a total of $4,233.16.

TREES SPRAYED

Street trees, like all other forms of vegetation, are subject to attacks of insects and diseases. The trees of this city suffer each year from these insects, principally the elm-leaf beetle, the tussock moth, and the fall web-worm. This office purchased two Stewart super-spraying machines with Fordson tractors, at a total cost of $4,247.10, to replace the horse-drawn equipment.

This department has sprayed 9,610 trees during the year for the extermination of leaf-eating insects. The life of the deciduous tree attacked by leaf-eating insects is directly endangered by them only when they keep the tree in a state of complete defoliation for several years in succession. Nevertheless, aside from disfiguring the tree for the season, defoliation tends to reduce its vitality. This often leads to attacks by other insects, principally bark and wood borers, which frequently result in fatalities to the infected trees.

NURSERIES

The young trees in the Fort Dupont and Poplar Point nurseries are doing very well. These sites are well stocked with those varieties that are considered best for street planting.

It has been impossible to plant trees along the recently improved streets due to inadequate appropriations and the loss of two nursery sites. This department transplanted 1,045 red oak trees, 561 white oak, 570 Norway maple, 6 sycamore maples, 62 elm, and 26 sycamore trees from the seed beds to the nursery rows at Fort Dupont nursery. The sum of $3,300.91 was expended in cultivating

and trimming the young trees in the nursery rows and seed beds at the Fort Dupont site.

At the Poplar Point nursery there were transplanted 798 red oak trees, 213 elms, 184 poplars, 162 acacia, and 114 Norway maple. The sum of $4,065.63 was expended in the propagation of trees at this nursery.

TRIMMING

Street trees require a great amount of trimming to prevent their encroachment on buildings and their interference with street and sidewalk traffic. It is necessary for the reasons stated to undertake the trimming of many trees, but this operation is not in all cases best for the welfare of the tree.

The silver maple trees are responsible for the largest outlay in trimming. This species was planted years ago to the exclusion of many kinds whose subsequent use proved more advantageous. This tree, as a street variety, is noted for the early decay of its branches. It requires close attention to keep it in proper condition.

A small force of men accomplished much trimming on individual requests.

A total of 10,884 trees were trimmed during the year at a total cost of $6,249.37.

In addition to the trimming for individuals the force attended to the miscellaneous casualties to trees and boxes reported by the police department. This casualty work was performed at a cost of $1,210.25. The sum of $618.82 was expended in removing broken limbs, trees, etc., from the streets caused by storms.

TREE SURGERY

Cavities are caused by any neglected injury to a tree through which the bark has been destroyed, thus allowing the wood to decay toward the center of the tree. The most common injuries result from neglect in treating wounds and removing stubs in pruning and failure to remove dead branches and those broken by storms. Treatment of cavities is ineffective unless all diseased wood is completely removed.

The cavities in 8 elm trees, 1 pin oak, 12 linden, 5 sycamore, 2 silver maple, and 1 Norway maple tree standing at the curb line, and 1 sycamore, 1 tulip poplar, and 1 silver maple tree standing in the public parking were given attention.

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES

The value of cultivating young trees is not fully appreciated. The cultivation of small trees for four or five years after they have been transplanted to the street is absolutely necessary to insure good growth. It is not only beneficial to the young trees, but in addition destroys a rank growth of weeds that spring up around them. The cultivation of the soil adjacent to the tree permits air to reach the roots, renders more available the plant food the soil contains, allows the young tree to derive the fullest benefit from rainfall, and prevents the rapid evaporation of moisture.

A total of 2,460 young trees were cultivated during the year at a total cost of $491.71.

The sum of $2,528.67 was expended during the year for the removal of weeds from uninclosed parkings along the streets, and the sum of $177.09 for the miscellaneous care of the small reservations under the control of the commissioners of the District of Columbia. There were 924 wooden tree boxes and 235 iron tree guards removed from the large trees throughout the city.

PAVING OF ABANDONED TREE SPACES

The work of paving abandoned tree spaces throughout the city was performed by the surface division, engineer department, and the cost of this paid from the appropriation for the trees and parkings division. A total of $245.69 was spent on this work.

REGULATION OF TERRACES

This office issued 1,005 permits affecting the grade of terraces in connection with building operations in the residential districts during the year. The regulation of parking grades is proceeding very satisfactorily, and we have had very little trouble with builders relative to maintaining uniform parking grades.

This department believes that the condition of the shade trees of Washington is, generally speaking, the best that can be expected when the adverse circumstances attending their growth, health, and life are considered. In his natural interest and civic pride the Washingtonian all too frequently loses sight, as his complaints indicate, of the tremendous handicaps under which the city tree must not only live but live well to bear out such traditions as "The City Beautiful" and "The City of Trees."

For instance, the city tree is deprived of the natural seepage under which its country fellow thrives. It depends on its miniature and unnatural parking for rain water. Contrast this alone with the country tree that has acres for surface seepage and then marvel that the city tree, hemmed in by miles and miles of concrete, its roots writhing about leaky gas mains, blocked by electric conduits and water pipes, lives at all. Add to these apparently insurmountable obstacles salt water from ice cream freezers, oil from roadways and motor vehicles, the indifference of the curb setter, the conduit layer, the lineman, and the plumber—and the hardihood and beauty of our trees present one of those superb feats of adjustment that, in my opinion, should rank well up in Darwin's theory of survival and a natural adjustment.

Latterly another menace has arisen. Consider the thousands of automobiles that pass any given downtown tree in a single day. Now, consider the hundreds of thousands of cubic feet of poisonous gases that are discharged by these automobiles and that must be neutralized by the life forces of the city tree. Consider this and then do not ask why a tree is apparently failing but rather why it lives at all.

It has always been the aim of this department to keep the trees in foliage during the hot summer months. In the last few years we

have been far more successful in this than in the past, due principally to the increases in our appropriations. To care for 500 miles of trees with our limited force and necessarily limited equipment might indeed be classed as a Herculean task.

Many of Washington's trees are poor specimens. They are being replaced as methodically and as rapidly as the funds available permit. But even then is it not better to have a relatively poor species of shade tree, for instance the silver maple, than no tree at all?

If large appropriations are given for the cutting through and improvement of streets, is it not logical to assume that if trees are to be planted along them that the appropriation for the department of trees and parkings should be increased proportionately or provision made for planting expenditures from the former appropriation?

At any rate we are doing the best we can with the funds available, and all we ask is the same splendid cooperation that has characterized the dealings of this department with the citizenry of Washington in the last few years.

In conclusion, let us all remember that a tree is one of the most magnificent gestures of a beneficent divinity.

Summary

Curb trees on streets at close of fiscal year 1923	104,593
Net decrease of curb trees during fiscal year 1924	299
Curb trees on streets at close of fiscal year 1924	104,294

Very respectfully,

C. LANHAM,
Superintendent Trees and Parkings.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE CITY REFUSE DIVISION

WASHINGTON, D. C., *August 4, 1924.*

SIR: I have the honor to submit the following report of the operations of the city refuse division, engineer department, for the year ended June 30, 1924.

The amount of money turned into the Treasury from grease and salvaged material totaled $302,642.54. Considering the market prices at which these products were forced to be sold the total is very satisfactory, and it constitutes a substantial sum toward the upkeep of the city.

The amount of garbage collected was less than in the previous year, but from it more grease was produced. Similarly there was salvaged a greater amount of miscellaneous trash from a lesser quantity of trash collected.

The total receipts were as follows:

Garbage grease sold	$196,630.79
Salvaged trash sold	101,741.58
Dead animal hides sold	1,975.00
Manure sold	2,295.17
	302,642.54

The total expense of collecting and disposing of all the city refuse was $821,155.35, so that the net cost of this work was $518,512.81.

It is to be noted that the wage scale of laborers and mechanics was substantially increased in December of 1923. Laborers and drivers previously receiving $2.72 and $2.88 per day were advanced to $3.04 and $3.20, respectively, so that the unit cost of all work from December on was materially increased.

The garbage disposal plant produced 3,607,600 pounds of grease from 75,089 tons of garbage collected, compared with a production in the previous year of 3,451,859 pounds from 80,014 tons. The expense of this reduction, including the freight charges on the raw garbage from the transfer station in Washington to the plant at Cherry Hill and capital expenditures for improvements to plant, was $167,953.70, so that this plant virtually operated at a profit of $28,665.71.

The trash plant cost to operate $95,048.71. The excess of receipts over expenditures at this plant was $6,692.87. Included in the expenditures is an item of $9,000 for the purchase of 6 acres of land adjoining this plant.

By act of Congress the commissioners were prohibited from letting any further contract for the collection of dead animals after July 1, 1923. This work, involving the collection of 34,764 dead animals, was done by the District at a gross cost of $6,886.81. The return from hides sold was $1,975, so the net cost of this work was $4,911.81. This cost would have been materially reduced had it been possible to sell the hides of 154 large animals which it was necessary to bury at a remote place and at great expense in the way of hauling and digging in the period from August 21 to October 27, during the time when the private rendering plant, which during the rest of the year handled these animals for the District, was in process of rehabilitation after a severe fire.

The ashes from private householders were collected and disposed of at a cost of $131,589.11. Much of this material was used with benefit as a temporary surfacing to newly opened streets and alleys.

The amount expended for dust prevention and cleaning of streets and alleys and the removal of snow was $392,185.86. The tables appended hereto show the yardage cleaned by the several different methods and the cost of each. It is to be noted that some 96,000,000 square yards more were cleaned by hand patrol during the course of the year than in the previous year. This means about 352,000 square yards more cleaned each day and is to be accounted for by reason of new pavement laid during the year. Under the extensive construction program undertaken by the surface division this year the yardage to be cleaned will be substantially increased.

At the beginning of the year this office was required, as were all other offices, to set aside a general reserve of 5 per cent under each appropriation. This division endeavored to comply with this demand and to carry on the operations on a businesslike and economical basis; saving wherever it was possible to do so. In this effort there was turned back into the Treasury $38,844.65 from the appropriation for city refuse disposal and $7,814.14 from the appropriation for street cleaning.

The results obtained in the several services in this division are the consequence of good teamwork on the part of the employees. I take this opportunity to express my appreciation of their loyal efforts.

MORRIS HACKER,
Supervisor City Refuse.

To the ENGINEER COMMISSIONER.

Cost of street cleaning, July 1, 1923, to June 30, 1924

	Area (square yards)	Cost	
		Total	Unit per M
Machine cleaning, horse	64,673,000	$21,312.26	$0.330
Machine cleaning, motor	51,619,000	13,538.78	.262
Alley cleaning	85,716,000	53,227.77	.622
Suburban cleaning	38,259,000	20,776.27	.542
Hand patrol	1,563,035,000	205,551.42	.131
Motot flushing	89,246,000	9,726.74	.109
Squeegeeing	46,387,000	7,772.83	.169
Sprinkling		5,500.01	
Annual overhead		797.33	
Property accounting		2,170.65	
Dump men		2,128.56	
Waste paper boxes		5,316.35	
Sunday cleaning		3,049.99	
Snow and ice		9,215.84	
Total		360,084.80	

Table showing comparative data in connection with street-cleaning work, 1920 to 1924

SQUARE YARDS CLEANED

	1920	1921	1922	1923	1924
Hand patrol	1,173,802,000	1,323,163,000	1,357,169,000	1,466,464,000	1,563,035,000
Machine, horse	98,350,000	119,256,000	66,194,000	65,451,000	64,673,000
Machine, motor			45,140,000	49,197,000	51,619,000
Alley cleaning	55,344,000	69,090,000	57,288,000	63,082,000	85,716,000
Suburban streets	34,550,000	60,382,000	50,221,000	39,234,000	38,259,000
Squeegeeing	111,008,000	127,596,000	94,650,000	59,940,000	46,387,000
Flushing / Motor flushing	24,433,000	40,842,000	48,223,000	72,628,000	89,246,000

DIRECT TOTAL COST

Hand patrol	$237,490.76	$253,485.93	$208,573.06	$204,983.34	$205,551.42
Machine, horse	40,915.64	48,237.93	20,337.33	19,534.74	21,312.26
Machine, motor			9,974.13	13,065.07	13,538.78
Alley cleaning	44,239.33	45,696.39	35,171.92	39,392.12	53,227.77
Suburban streets	24,231.40	33,372.65	19,887.76	18,024.78	20,776.27
Squeegeeing	24,743.81	27,684.70	14,286.34	11,845.35	7,772.83
Flushing / Motor flushing	6,835.91	7,424.31	6,498.78	8,795.66	9,726.74

COST PER 1,000 SQUARE YARDS

Hand patrol	$0.202	$0.192	$0.154	$0.140	$0.131
Machine, horse	.416	.404	.307	.298	.330
Machine, motor			.221	.266	.262
Alley cleaning	.800	.661	.614	.624	.622
Suburban streets	.702	.549	.395	.459	.542
Squeegeeing	.223	.217	.151	.198	.169
Flushing / Motor flushing	.279	.182	.135	.121	.109

Table showing comparative data in connection with disposal of all city waste from 1920 to 1924

NUMBER OF UNITS COLLECTED

	1920	1921	1922	1923	1924
Garbage.....tons..	52,793	60,056	69,452	80,014	75,089
Ashes.....cubic yards..	148,228	135,940	156,100	145,432	151,272
Miscellaneous refuse.....do....	170,286	148,908	196,763	190,021	186,907
Night soil.....barrels..	12,734	12,507	14,190	15,217	16,063
Dead animals.....number..	19,995	24,704	28,675	30,120	34,764

TOTAL NET COST

Garbage.....	$178,311.57	$283,406.63	$210,268.15	$187,314.43	$235,235.01
Ashes.....	114,248.38	116,421.04	135,267.18	117,727.67	131,589.11
Miscellaneous refuse.....	46,522.26	66,029.59	107,439.84	51,067.38	84,139.49
Night soil.....	17,500.00	17,500.00	17,500.00	17,500.00	24,000.00
Dead animals.....	3,360.00	3,360.00	3,360.00	3,360.00	4,911.81

Miscellaneous data on contracts

Class of waste	Contractor	Period of contract	Date of expiration	Price per annum	Collected from—
Night soil.....	Warner Stutler....	3 years....	June 30, 1926	$24,000	All privies in the District.

REPORT OF THE SURVEYOR

WASHINGTON, D. C., *August 22, 1924.*

SIR: I submit herewith report of the operations of the surveyor's office for the year ended June 30, 1924.

This report includes all street-extension matters, such as condemnation of streets, alleys, and parks and other miscellaneous condemnation cases, all of which require descriptions, plats, surveys, and computations covering the land condemned.

The work of this office is divided into three classes:

1. Work performed for private parties, for which fees are charged according to a regular schedule of fees prescribed by the commissioners and estimates made by this office.

2. Work performed for the various departments of the District and Federal Governments. No fees are charged for this class of work.

3. Surveys, descriptions, and reports on condemnation cases for streets, alleys, etc.

During the fiscal year just ended (July 1, 1923, to June 30, 1924) the amount of work performed by this office on an average has been about even with that performed the year previous, these two years showing a great increase over the amount of work for the years preceding them. In some cases during the past fiscal year the work has increased and in some cases slightly diminished over that of the year previous.

As a matter of comparison the following figures are given, showing the amount of work for the past fiscal year (1923–24) as compared with the amount of work during the year previous (1922–23), which will be referred to in this report as "past fiscal year" and "year previous," respectively.

Work for private parties: Number of individual lots surveyed: Past fiscal year, 5,536; year previous, 6,065. Certificates (or plats of survey) issued: Past fiscal year, 2,573; year previous, 2,880. Surveys to locate foundation walls of buildings being erected: Past fiscal year, 1,626; year previous, 1,893. Number of buildings inspected in connection with foundation-wall surveys: Past fiscal year, 1,356; year previous, 1,305. Surveys of unsubdivided county tracts: Past fiscal year, 344; year previous, 202.

Subdivisions: Subdivision plats prepared in duplicate: Past fiscal year, 547; year previous, 587. Subdivisions recorded: Past fiscal year, 456; year previous, 496. Total number of lots in subdivisions recorded: Past fiscal year, 4,208; year previous, 4,632.

Plats issued in connection with permits: Plats made by this office to accompany applications for building permits (commonly called "building plats"): Past fiscal year, 6,553; year previous, 6,452. Plats made up under regulations covering zoning law, for the erection of garages, motors, etc.: Past fiscal year, 403; year previous, 175.

Miscellaneous plats: Plats of all kinds made up on order of private parties: Past fiscal year, 10,431; year previous, 10,308.

Estimates issued and fees collected: Estimates of cost (issued in triplicate): Past fiscal year, 11,707; year previous, 12,659. Total of fees paid to collector of taxes for work done by surveyor's office: Past fiscal year, $43,925.50; year previous, $48,461.90.

Work for the District and Federal Governments: Surveys: Past fiscal year, 125; year previous, 135. Plats recorded (condemnations, dedications, etc.): Past fiscal year, 117; year previous, 101. Reports to inspector of buildings concerning foundation walls in course of erection: Past fiscal year, 1,626; year previous, 1,893. Assessment and taxation plats recorded: Past fiscal year, 1,152; year previous, 709.

For the District and private parties: Total number of surveys made for the District and private parties: Past fiscal year, 4,679; year previous, 5,122.

Total of plats, public and private (including plats drawn in books): Past fiscal year, 14,315; year previous, 14,669.

The following table showing the comparisons as given above is submitted for your information:

	Fiscal year 1922-23	Fiscal year 1923-24
For private parties:		
Individual lots or parts of lots surveyed in city and county	6,065	5,536
Certificates of survey issued covering one or more lots	2,880	2,573
Duplicates of above recorded in survey certificate books	2,880	2,573
Separate surveys made to verify walls	1,893	1,626
Postal card reports concerning walls issued to owners	1,893	1,626
Individual buildings inspected as to location of walls	3,305	1,356
Large tracts in county surveyed, subdivided, and recorded	12	11
Outline surveys in county of unsubdivided tracts	202	344
Subdivision plats prepared in duplicate	587	547
Duplicate subdivisions prepared for assessor	587	547
Subdivisions recorded	496	456
Total of individual new lots in subdivisions	4,632	4,208
Plats of one or more recorded lots to accompany applications for building permits (commonly called "building plats"), in duplicate	6,452	6,553
Plats made up under regulations for theaters, garages, etc	175	403
Estimates of cost issued in triplicate	12,659	11,707
Plats made up on order of private parties	10,308	10,431
Total of fees paid to collector of taxes by private parties	$48,461.90	$43,925.50

	Fiscal year 1922-23	Fiscal year 1923-24
For the District of Columbia:		
Surveys made for the District of Columbia	135	125
Plats recorded (condemnations, dedications, etc)	101	117
Reports concerning walls to building inspector	1,893	1,626
Assessment and taxation plats recorded	709	1,152
Miscellaneous:		
Total of surveys for the District of Columbia and private parties	5,122	4,679
Total of plats, public and private, including plats drawn in books	14,669	14,315

HIGHWAY PLAN

An appropriation of $2,000 was made to be used for the purpose of marking on the ground the permanent system of highways in the District of Columbia.

These highways are laid down in accordance with a plan which was made many years ago under an act of Congress which provided for the extension of streets in the District of Columbia as development is made beyond the limits of the original Federal city in an orderly, comprehensive manner. This law is believed to have been one of the most important and advantageous for the proper development of real estate into blocks and lots for home owners that has ever been placed upon the statute books. This plan, which is known as the highway plan, can not be changed or amended in any manner except upon approval of a highway commission composed of the Secretary of War, the Secretary of the Interior, and Chief of Engineers, United States Army, and all new subdivisions made must conform to this plan.

This appropriation has been used to good advantage, and many of these street lines have been marked at street intersections in connection with this work.

About 150 stone monuments have been planted to mark these streets, and some of the prominent streets marked are as follows:

Central Avenue from Benning Road to Southern Avenue SE.

Fourteenth Street through Walter Reed Hospital grounds.

Belt Road from Chesapeake Street to Harrison Street NW.

Broad Branch Road from Rock Creek Park to the District line.

Canal Road at various points along its line.

Some changes have been made in the highway plan during the past year, it being necessary each year to make changes for practical reasons as development takes place or because more advantageous routes can be obtained on account of topographical reasons. The changes made during the past fiscal year are as follows:

Woodley Road between Twenty-ninth Street and Cathedral Avenue NW.

Seventeenth Street between Blagden Avenue and Colorado Avenue NW.

Rock Creek Church Road between Ninth and Tenth Streets NW. (eliminated).

Spring Road between Rock Creek Church Road and Tenth Street (widened).

Princeton Place between New Hampshire Avenue and Rock Creek Church Road NW. (widened).

Davenport Street between Thirty-second Street and Connecticut Avenue NW.

Varnum Street between Iowa Avenue and Fourteenth Street (eliminated).

Webster Street between Iowa Avenue and Arkansas Avenue (eliminated).

An appropriation of $1,500 has been provided for the past year and for several years previous to that to carry on this work of revising the highway plan, which has been used in drafting and computing work in making these changes as outlined above.

These two small appropriations used to carry on the work in connection with the highway plan should be made again the coming fiscal year and carried on as a continuous appropriation for this work.

SUBDIVISIONS

There has been the usual amount of activity going on in subdivision work outside of the original city limits.

Some of the new subdivisions made are as follows:

Subdivision by the Chevy Chase Land Co., squares 1743 to 1748, inclusive, at Belt Road and Western Avenue.

Subdivision by the Southeast Realty Corporation, squares 5597, 5598, 5604, 5608, and 5615.

Subdivision by James M. Carter, squares 3268, 3271, 3284, 3285, and 3287, between Rittenhouse and Underwood Streets, Third and Fourth Streets NW.

Subdivision by Highview Land Co., squares 5650, 5651, 5677, 5678, 5688, and 5689, at intersection of Bowen Road and Branch Avenue SE.

In all these cases it is necessary to mark the block corners of the new subdivisions with stone monuments, and the fees collected for platting these new subdivisions include also the cost of the survey work, making computations, and planting corner stones.

CONDEMNATION CASES

During the past fiscal year there have been before the courts 36 condemnation cases for streets, alleys, parks, etc., and 12 alley cases. Of these 48 cases 18 were confirmed by the court, some being dismissed and others carried over to the present fiscal year.

The total of damages awarded by the juries in the cases confirmed amounted to $139,823.15 in all, $118,020.69 for streets, parks, etc., and $21,802.46 for alleys.

These figures will show the magnitude of this condemnation work.

Some difficulty has been experienced in prosecuting condemnation cases to a conclusion on account of the juries not being able to find benefits equal to the amount of damages and court costs.

It is thought some provision should be made whereby such cases can be successfully carried through the courts and these cases pushed to a conclusion. The general law upon which condemnation cases are prosecuted requires that the total amount of damages and

the court costs shall be paid for from the assessments for benefits as found by the jury, and special legislation is required to provide an appropriation where the assessments for benefits can not be found by the jury to equal the total amount of the damages and court costs. In many cases, especially where there are improvements on the property to be condemned, the jury is unable to find sufficient benefits to pay the awards.

Following are the streets acquired during the past year by condemnation or dedication:

Arkansas Avenue between Thirteenth and Sixteenth Streets.

Buchanan Street between Fourteenth Street and Arkansas Avenue.

Allison Street between Fourteenth Street and Arkansas Avenue.

Webster Street between Fourteenth Street and Arkansas Avenue.

Davenport Street east of Connecticut Avenue to Linnean Avenue.

Davenport Street west of Connecticut Avenue.

Bellevue Terrace between Garfield and Jewett Streets.

Jewett Street west of Bellevue Terrace.

Brandywine Street between Connecticut Avenue and Reno Road.

Fourteenth Street Road (now Ogden Street) between Fourteenth and Sixteenth Streets NW.

Shannon Place and U Street SE.

Third Street between Rhode Island Avenue and Adams Street N.E.

Franklin Street between Eighteenth and Twentieth Streets N. E.

Lane Place and Lee Street NE.

Widening "A" Road west of Sixteenth Street.

Minnesota Avenue between Hunt Place and Washington Railway & Electric Co. right-of-way.

A table showing the condemnation cases in court during the past fiscal year and the cases which have been confirmed by the court is on file in this office.

PARKS

The question of parks is one of vital interest to the residents of the District, and a park system should be provided throughout the District, just as a street plan is provided, by acquiring from time to time park areas before development and improvements prevent the acquisition of the most desirable land for this purpose.

Congress has recognized this fact, and during the past fiscal year, by legislation, a park commission was created, known as "The National Capital Park Commission," whose function is to go into this important question and determine just what areas should be acquired and to take the necessary steps for their acquisition.

This commission is composed of the Chief of Engineers, United States Army, the Engineer Commissioner of the District of Columbia, Director of National Park Service, Chief of Forestry Service, officer in charge of public buildings and grounds, the chairman of the Senate Committee on the District of Columbia, and the chairman of the House Committee on the District of Columbia.

This commission now has under consideration the acquisition of many important park areas in the District, among them being sev-

eral which have been recommended by this office for several years past.

This office has recently recorded a large park area donated to the District by Mr. C. C. Glover, which is known as "The Glover Parkway and Children's Playground." This park comprises a large area along Foundry Branch, on both sides of Arizona Avenue, between Massachusetts Avenue and Reservoir Street NW., containing in all approximately 77½ acres. This is a valuable donation and constitutes quite an addition to the park system of the District, and the donor, Mr. Glover, is to be commended for the public-spirited and generous motives which prompted the gift of this valuable area to the District.

The following small areas were acquired during the past year for small parks at street intersections:

Square north of square 931, at Florida Avenue, West Virginia Avenue, and L Street NE.

Square 4351, at Twenty-eighth Street, Douglas Street, and Bladensburg Road NE.

Square 3526, at Second Street, Prospect Street, and Eckington Terrace NE.

Square 5420, at Minnesota Avenue, Thirty-sixth Street, and Croffut Place SE.

Square 5443, at Thirty-fourth Street, Minnesota Avenue, and D Street SE.

Square 4542, at Thirty-fourth Street, Minnesota Avenue, and E Street SE.

Parcel 156/39, at Twentieth and Jackson Streets NE.

RENO

A movement was started during the past year to acquire the subdivision of Reno for park, school, playground, water, and street purposes. This subdivision is ideally located for this purpose, being situated on one of the highest spots in the District, and is the center of what is to be a great business and residential area.

The subdivision was made in 1869, with streets 25 and 30 feet wide, and with very small lots. Since the subdivision was made the improvements erected have been mostly of a cheap or modest character, the streets being too narrow to permit of standard improvements.

The subdivision is out of harmony with the highway plan, which was adopted some years later, and will therefore prevent the development of the highway plan in an orderly, comprehensive manner. This irregular, ill-devised plan makes an objectionable subdivision, and will remain a blight upon this locality for all time to come if not eliminated. The only way that this objectionable spot can be eliminated so that the city can develop in harmony with the surrounding territory would be to condemn the entire area, composed of about 52 acres.

It can well be seen by a study of the highway plan that this is a great blight upon this section of the District, and its influence

will be felt even outside its limits. The surrounding territory is being developed by high-class residents, and it is evident to anyone who has made a study of the development of the District that this point will be heart and center of all this section of the District. The development of the surrounding territory is growing rapidly, and if blocked by this misfit subdivision, will be a great reflection upon those responsible for the development of the city plan.

Besides the advantages accruing from the elimination of this subdivision, there are other considerations which are of interest. Besides being on the highest site in the District, with an elevation of 420 feet, it is the site of old Fort Reno, one of the old Civil War defenses of the city of Washington, and is therefore of great historical value. This old fort can be restored within the park area.

In addition the water department must have additional land for the extension of the high-service reservoir, and an appropriation has been made, it is understood, for that purpose. It is impracticable, however, to locate at this point now on account of the impossibility of closing the streets and alleys within the area desired.

The public-school authorities have inspected this property and are anxious to establish here a junior high school with an athletic field. This rapidly growing section demands such a school, and there is no location as attractive as the one within these limits.

A committee of prominent citizens was called together at a meeting in the board room of the commissioners, and they all heartily indorsed this project, with the belief that it would be a very advantageous project to the District and the residents of this section if it could be acquired and utilized as outlined.

PERSONNEL OF OFFICE

The office force has diligently and efficiently performed the vast amount of work coming before the office during the past year—work which is of a character that must be done speedily and accurately—and commendation is due the employees for the competent services rendered.

M. C. HAZEN,
Surveyor.

The ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF INSPECTOR OF BUILDINGS

WASHINGTON, D. C., *July 31, 1924.*

SIR: I submit herewith annual report covering the transactions of the building division during the fiscal year ended June 30, 1924. This does not include the report of Federal Government operations during the year.

Statement of permits issued from July 1, 1923, to June 30, 1924

	Number	Value		Number	Value
Brick:			Brick—Continued.		
Apartments	81	$5,734,000	Stores and flats	1	[illegible]
Auto repair shop	1	2,000	Studio	1	[illegible]
Bakery	1	20,000	Temple	1	[illegible]
Banks	3	266,000	Theaters	1	[illegible]
Business building	1	75,000	Theater and office building	1	[illegible]
Cathedral	1	675,000	Transformer station	1	[illegible]
Chapel	1	20,000	Warehouses	20	[illegible]
Churches	7	316,500	Hollow tile:		
Club	1	10,000	Dwellings	7	[illegible]
Convents	2	80,000	Garages	20	[illegible]
Department store	1	250,000	Repairs	1	[illegible]
Dwellings	1,425	12,868,365	Concrete:		
Factory	1	50,000	Church	1	[illegible]
Film studio	1	64,000	Dwellings	2	[illegible]
Garages	487	1,625,618	Garages	81	[illegible]
Gas stations	13	83,400	Gas stations	2	[illegible]
Hospital	1	200,000	Gas storage holder	1	[illegible]
Hotel	1	300,000	Repairs	1	
Laboratory	1	90,000	Storage plant	1	[illegible]
Laundries	3	60,500	Theater	1	[illegible]
Library	1	61,000	Metal:		
Lodges	2	72,000	Garages	1,847	[illegible]
Market	1	59,000	Greenhouses	2	
Mission buildings	2	250,000	Sheds	14	
Museum office building	1	994,081	Store	1	
Nurses' home	1	125,000	Frame:		
Office buildings	10	764,000	Café	1	
Print shop	1	50,000	Church	1	
Post office	1	8,000	Dwellings	647	[illegible]
Power house	1	17,000	Garages	271	
Repairs	1,946	3,019,729	Greenhouses	1	
Retaining wall	1	265	Ice house	1	
Schools	4	659,000	Repairs	760	
Service stations	5	70,500	Sheds	160	
Sheds	8	17,775	Machinery:		
Shops	4	29,200	Elevators	75	
Stables	2	1,250	Motors	208	
Stores	137	1,317,650			
Stores and apartments	6	1,818,500			
Stores and dwellings	5	28,000	Total	8,368	[illegible]
Stores and offices	2	81,000			

Distribution of improvements in sections

	Buildings	Re[illegible]
Northeast	$1,436,475	
Southeast	1,560,015	
Northwest	11,916,763	[illegible]
Southwest	593,760	
County	19,215,530	[illegible]
Total	34,722,046	[illegible]
	4,681,161	[illegible]
Sum total	39,403,207	[illegible]

Comparative statement for years 1923 and 1924

	New buildings	Repairs, etc.	Dwellings	Apartments	[illegible]
1924	3,012	5,356	2,079	81	[illegible]
1923	3,478	5,938	2,460	81	[illegible]
Decreases	466	582	381		[illegible]

Valuation of building operations, including awnings and signs:	
1924	$39, 403, 207
1923	57, 690, 038
Decrease	18, 286, 831
Permits issued, number, including awnings and signs:	
1924	11, 446
1923	12, 191
Decrease	745

Estimated number of buildings in the District of Columbia

	Brick	Tile	Concrete	Stone	Frame
1924, erected	2, 246	27	89		651
1924, razed	81				78
Total	2, 165	27	89		573
1923	74, 098	389	276	2	28, 743
Total number standing	76, 263	416	365	2	29, 316

A comparison of the foregoing report with that for the fiscal year 1923 shows a difference in the value of building operations in round numbers of $18,000,000 decrease in the present year; the difference in the number of permits was 745.

The falling off in operations indicated by the foregoing comparison is, however, more apparent than real as to the trend in construction activity, as the plans filed and the permits issued during the first two months of the present fisscal year argue a greater volume of operations than was conducted in 1923.

The most important feature of the tabulation, taken in connection with the summaries for the last several years, is the evidence it affords in support of the opinion that in the volume of building operations the District has definitely settled upon a plane of normal activity approximately three times as great as obtained theretofore.

This being the case, it is believed essential and proper that attention should be urged to the fact that the building inspection division has been handicapped for some time past by reason of inferior equipment, inadequate facilities, and lack of space. Recently, for example, a week elapsed during which the office was without permit books, owing to the lack of funds against which to charge the cost thereof.

The problem of space in which to place file cases must soon be faced; the desks used by the assistant inspectors are unsuited to the purpose; the administration of the zoning bureau is obstructed by the absence of filing convenience; the smooth dispatch of work is impossible because of the constant difficulty experienced in getting necessary office supplies, due to the lack of appropriation.

The administration of the zoning law and regulations has grown each year since the act became effective, until now it has become one of the most important functions of the office. There is no separate appropriation to meet the expense incurred, with the result that the allotment made to the inspector of buildings' office must be drawn upon.

There has been no division of the district government the work of which has increased in a greater degree than has the work of the building inspection division. Aside from the zoning branch, the increase has been about 150 per cent, and this increased work has become so stabilized as to be normal, yet no substantial recognition has been taken of this fact, except for an appropriation for temporary inspectors, which is unfair to the department, an unfairness emphasized by the fact that the department must deal so largely in direct personal contact with the public, which demands such prompt and efficient service as intelligent and close attention to duty aided by adequate facilities will permit.

There seems to be a feeling on the part of the general public to more carefully regard the instructions of the building department in matters pertaining to construction. This attitude is to be desired, since it evidences a spirit of cooperation, while at the same time it places an increased burden on the personnel of the department, which is already severely taxed by the normal amount of work.

Increased numbers of requests have been received for examination of falling plaster, settling of floors, broken window arches, and other matters trifling in themselves but contributing to a serious accident. The department appreciates this confidence which the public places in it and hopes to be able to better meet their approval in the future.

Permits are being issued at the rate of 60 a day, meaning that each inspector receives an average of 6 permits a day for his territory. Upon a check recently made of the number of various kinds of jobs now under way within the various territories, it was found that each inspector has on his book an average of 280 permits for work under operation.

There are at present under construction 36 buildings involving structural-steel framing, including such buildings as the Cosmopolitan Theater, Colored Masonic Temple, Kappa Lodge Temple, etc., and 56 reinforced concrete structures of over four stories in height. These buildings alone require from nine months to a year to complete and necessitate many inspections and delicate construction problems to be settled.

The department points with pride to the confidence which the builders of the large reinforced structures have in the vigilance of the inspectors of this department.

The inspection of elevators has assumed such proportions as to merit consideration of means to increase the personnel so as to guarantee absolute safety of operation in this type of public vehicle. This department has recently assumed the inspection of all elevators within the Federal buildings, imposing a vastly increased amount of work upon the present personnel, which is hard pushed to perform its normal work. The installing or examination of elevators requires from two to four hours on each machine, therefore it can be readily seen that a single building such as our larger hotels or department stores would require an inspector's full time for one or two days.

The present force of temporary inspectors should be made permanent. The desirability of this is self-evident, as the time has passed when such a force may be needed for merely emergency or temporary purposes. The office could not possibly be acceptably conducted with

a less number of employees than now engaged. Besides, a temporary status is apt to operate against the morale of an employee because of the uncertainty of tenure and the natural inclination to look elsewhere for a fixed engagement, and it certainly tends to seriously handicap the efficient administration of the department.

It is urgently recommended that the present force of temporary inspectors be made statutory or regular employees, and that no appropriation for temporary men be sought, and that a contingent and miscellaneous appropriation, increased by at least $1,500, be asked of Congress, the amount mentioned to be allotted to the buildinig inspector's office in excess of the amount so allotted for the present fiscal year.

The expenses of the division during the past year, including $15,000 for temporary inspectors, amounted to $56,321.65, and the receipts to $59,063, a difference of $2,741.35.

There were issued 3,206 conforming and 542 nonconforming certificates of occupancy and 416 elevator operators' licenses in addition to the 8,368 building permits as listed in the above tabulation.

JOHN W. OEHMANN,
Inspector of Buildings.

The ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE INSPECTOR OF PLUMBING

WASHINGTON, D. C., *August 27, 1924.*

SIR: I submit herewith the forty-second annual report of the plumbing inspection division of the engineering department.

During the last year there were 26,648 inspections on plumbing work in new buildings, 5,249 inspections of plumbing work in old buildings, and 12,760 inspections in connection with complaints made of conditions of plumbing and guttering and spouting in old buildings, making a total of 44,657 plumbing inspections made by this office. The average number of inspections made by the field force was a little less than 13 per day, and the largest number of inspections in any one day was 31.

COMPLAINTS

Of the 12,760 complaint inspections made during the year (practically one-fourth of the entire field work) about one-half were complaints of defective plumbing in old houses, for which correction notices were served, and about one-half related to sheet-metal gutters and rain leaders and leaking roofs. Practically all of the gutter and downspout complaints, all of the leaky roof complaints, and about one-half of the defective plumbing complaints originated from other departments and were referred to this office for prosecution.

REGULATIONS

Several minor changes were made in the regulations during the past fiscal year, all of which had to do with the simplification of

plumbing practice and, in one instance, a very considerable saving to the small home owners, without in any way lowering the sanitary standard.

POLICE COURT CASES

During the year 22 warrants were obtained (nearly three times as many as for last year). Twenty of these cases were against unlicensed plumbers and 2 of them against licensed plumbers violating the regulations. The court exacted fines in 19 cases, took the personal bonds of 1, and 2 cases were nolle prossed, as the work was done before warrant was returned. A total of $260 was collected in fines. It is noteworthy that no case brought before the court by this office was decided adversely by the said court.

PLUMBING BOARD

The plumbing board held 24 meetings and examined 84 plumbers, of whom 12 passed and were granted license, so that at the close of the fiscal year there were 259 registered master plumbers in the District, about 220 of them being actively engaged in business; there were also 7 registered gas fitters.

PUBLIC CONVENIENCE STATIONS

There were in operation throughout the year four convenience stations, open from 6 a. m. until midnight, with two shifts of attendants, each working nine hours per day. The largest station, that at Seventh Street and Pennsylvania Avenue NW., accommodated 4,885,060 persons; that at Thirteen-and-a-half Street and Pennsylvania Avenue NW., 3,570,391; that at Ninth and K Streets NW., 3,055,837; and that at Fifteenth and H Streets NE., 1,892,371, making a total patronage of about 13,500,000. The cash receipts for the year amounted to $7,791.99 and consisted of 5-cent fees received for use of pay toilets, commissions received on telephone service, etc., being about 35 per cent of the actual cost of operation of the stations.

An effort should be made to add at least one station in the business section each year until the congested centers of the city are adequately served.

A. R. McGonegal,
Inspector of Plumbing.

To the Assistant to the Engineer Commissioner.

REPORT OF INSPECTOR OF STEAM BOILERS

Washington, D. C., *August 22, 1924.*

Sir: I have the honor to submit through Mr. J. William Downing, acting inspector of buildings, the following report for the fiscal year ending June 30, 1924, together with fees received and expenses incurred:

Boilers inspected	450
Boilers inspected for District of Columbia (no fee)	36
Boilers condemned as unfit for further use	10

Cases of scale and deposit	65
Cases of defective setting	35
Cases of defective steam gauges	10
Cases of defective tubes	50
Cases of defective boiler plates	25
Cases of working pressure reduced	10
Total amount received	$2,250
Total amount of expenses incurred	310
	1,940

Very respectfully,

E. F. VERMILLION,
Inspector of Steam Boilers, D. C.

The INSPECTOR OF BUILDINGS.

REPORT OF THE PERMIT CLERK, ENGINEER DEPARTMENT

WASHINGTON, D. C., *August 7, 1924.*

SIR: I have the honor to submit the following report of the permit clerk's office giving the number of permits issued during the fiscal year ended June 30, 1924:

Water connections	2,911
Repairs	673
Specials (no fees)	80
Sewer connections	2,920
Repairs	738
Specials (no fee)	978
Gas connections and mains	3,356
Repairs	157
Specials (no fee)	12
Electric connections and underground construction	3,686
Repairs	13
Conduits	688
Manholes, build and connect with sewers	330
Specials (no fee)	26
Air pipe lines and private conduits	13
Fences to inclose parkings	399
Guard stones in alleys	7
Pave parkings	171
Poles—erect, replace, and remove	1,138
Miscellaneous	14
	18,310
Permits of various kinds for work in public space	5,698
	24,008

Fees of $1 were paid for 17,214 permits; permits for which no fees were paid, 6,794.

Record cards were made of all files referred to this office, permits issued, or reports made and files returned to the divisions having supervision of inspections of work for which permits were issued.

Applications were filed according to location, and report of excavations in public space were made to the engineer of highways for necessary repairs.

H. M. WOODWARD,
Permit Clerk.

To the INSPECTOR OF BUILDINGS.

REPORT OF THE ELECTRICAL ENGINEER

WASHINGTON, D. C., *October 10, 1924.*

SIR: I have the honor to submit the following report of the operations of the electrical department for the fiscal year ended June 30, 1924.

STREET LIGHTING

The street-lighting system at the beginning of the fiscal year consisted of 21,256 lamps—11,316 gas and 9,940 electric (787 arc, 9,153 incandescent); on June 30, 1924, there were 21,823 lamps—11,519 gas and 10,304 electric (819 arc, 9,485 incandescent); an increase of 203 gas and 364 electric (32 arc, 332 incandescent), a total increase of 567 lamps, compared with 548 in 1923. Of the 1,017 lamps newly connected (gross) 586, about 58 per cent, were either designation lamps or of the next lowest powered gas or electric. The increase in aggregate candlepower of the street-lighting system is from approximately 1,848,300 to approximately 1,929,900, about 4.4 per cent. The project of bringing the street lighting throughout the District to the very necessary much higher standard has been carried forward in preparation. The committee on lighting needs, appointed by the commissioners, has made its report, a general plan of treatment has been approved by the commissioners, additional designs of ornamental lamp-posts, consistent with those now in use, have been approved by the Fine Arts Commission, subject to approval of details of models, and preparations are practically completed for application of the plan in the coming year on representative thoroughfares to the extent of the funds provided. It is confidently expected that the improvement to be made will demonstrate the advisability of further progress under the plan.

ARC LIGHTING

There has been no change from 283 in the number of 6.6-ampere magnetite arc lamps. There has been an increase of 32 in the 4-ampere magnetite arc lamps, to a total of 536 connected June 30, 1924. Of these, 20 were added on Pennsylvania Avenue NW. between Seventeenth Street and Washington Circle, 6 in the vicinity of Fourteeenth Street and Park Road NW., 2 at intersection of New Hampshire Avenue, M, and Twenty-first Streets, and 4 scattered.

INCANDESCENT ELECTRIC LIGHTING

The number of incandescent lamps added (other than designation lamps) is 564, discontinued 253, a net increase of 311, being 132 of 60 candlepower, 31 of 100, 4 of 200, 139 of 250, and 5 of 400 candlepower. Of the incandescent lamps added, there were placed four 400-candlepower lamps at intersection Pennsylvania Avenue and Seventeenth Street NW.; seventy-five 250-candlepower on Rhode Island Avenue, Fourth Street to District line NE.; thirteen 250-candlepower on H Street, Fourteenth to Seventeenth Streets NW.; thirteen 250-candlepower at Connecticut Avenue, vicinity of Rhode

Island Avenue and vicinity of Florida Avenue; twenty-five 100-candlepower, Kenilworth Avenue NE.; twenty-three 100-candlepower, Woodley Road; fourteen 100-candlepower, D Street and Maryland Avenue SW.; twenty-nine 60-candlepower in Takoma Park; seventeen 60-candlepower, Cleveland Avenue; nine 60-candlepower, Queens Chapel Road; seven 60-candlepower, Grant Road; seven 60-candlepower, Woodland and Normanstone Drives; the remainder scattered in lots of six or less.

The total number of incandescents (other than designation lamps) connected June 30, 1924, was 9,253, compared with 8,942 at the close of the preceding year.

MANTLE GASLIGHTING

The number of mantle gas lamps added was 398, discontinued 179, a net increase of 219. The total mantle gas lamps connected June 30, 1924, was 11,130 (10,820 60-candlepower, 310 120-candlepower), compared with 10,911 (10,759 60-candlepower, 152 120-candlepower) at the close of the preceding year. The additions were individual or in small lots widely scattered. Of the 60-candlepower gas lamps, 129 were changed from upright to inverted mantle.

DESIGNATION LAMPS

The number of designation lamps added was 23 (2 gas and 21 electric), and the number discontinued was 18 gas, a net increase of 5; of the 18 lamps discontinued, 3 were replaced by electric. The additions were all scattered. The discontinuance of 15 gas not replaced by electric was due to substitution of street-designation signs on existing arc-lamp posts for gas-lighted signs on separate posts. The total of designation lamps connected June 30, 1924, was 621 (389 gas, 232 electric), as compared with 616 (405 gas, 211 electric) at the close of the preceding year.

LIGHTING ALONG STEAM RAILROADS

The situation with respect to the several suits brought by the District of Columbia against certain railroad companies for repayment for sums expended for the lighting of streets, avenues, etc., adjacent to their several right-of-way, remains as reported for the past four years. The new trial of typical case in the lower court, necessitated by ruling of the court of appeals, has not been reached. The sum to be added in claim for the fiscal year is $9,968.10.

SIGNAL SYSTEM

The fire-alarm telegraph, the police-patrol signal, and the telephone systems have been operated and maintained, and each has expanded slightly to meet, in part at least, the growing requirements.

Fire-alarm boxes added to the system number 25 (15 public and 10 private), and 1 private box was discontinued, a net increase of 24, to a total in service June 30, 1924, of 806 (630 public, 176

private). Boxes connected by underground wires were increased by 27, to a total of 690, and boxes connected by overhead wires were decreased by 3, to a total of 116.

Reference is invited to report of fiscal year 1923 on serious need of extension of fire-alarm system as to boxes in the suburbs, and the recommendation therein repeated.

Careful inspection, maintenance, and repair service on the apparatus has been maintained. Through most intimate cooperation with fire department organizations, methods of personnel operation on additional alarms have been improved.

The number of fire alarms received and transmitted through fire-alarm headquarters was 2,711, compared with 2,826, 2,033, 1,795, and 1,815 in the next four preceding years; this includes 41 "additional" alarms (18 second, 13 third, 8 fourth, and 2 fifth), compared with 34 (19 second, 10 third, and 5 fourth) in the next preceding year. False alarms numbered 278, compared with 210, 181, and 145 in the next three preceding years, the false box alarms (198) being nearly 16 per cent of the total regular box alarms, compared with under 13 and above 14 per cent in the next two preceding years. The number of regular box alarms was 47 per cent of the total of box and local (exclusive of "additional") alarms, compared with 44 and nearly 50 per cent in the next two preceding years.

The number of police-patrol boxes added was 2, discontinued 3, a net decrease of 1, compared with increases of 3 and 12 in the next two preceding years, making the total connected June 30, 1924, 489; of these, 390 are connected on underground and 99 on overhead wires. Due to establishment of twelfth precinct and to changes in precinct boundaries incident thereto, 62 boxes were changed as to station connection.

The needs of the police-patrol system as to extension are fairly well met annually, but reference is invited to 1923 report on need of completing the modernization of the system inaugurated in 1910 and the recommendation therein repeated.

The number of telephones added, connected to the two private branch exchange switchboards, under the jurisdiction of this department, the main District of Columbia P. B. X., Main 6000, and the fire-alarm headquarters P. B. X., Main 20, was 23, and 8 were discontinued, a net increase of 15, identical with that of preceding year. Connected to other District P. B. X. switchboards, which are tie-line connected to Main 6000 switchboard, additions were made as follows:

Police department, 5 added, 1 discontinued, net increase, 4; Franklin School, 3; Miner Normal School, 1; House of Detention, 1 extension; Gallinger Hospital, 30. Board of Children's Guardians, 1 switchboard with 9 telephones installed. National Training School for Girls (without connection to Main 6000), 1 switchboard with 11 telephones installed. The number of telephones of the entire District of Columbia system was increased by 75 (compared with 97 and 26 in the next two preceding years) to a total connected June 30, 1924, of 1,625, exclusive of 28 portable sets in service, the property of the District of Columbia, used by the fire department and the electrical department.

The number of cells of storage battery in service on fire-alarm, police-patrol, and local circuits has been increased by 518 to a total of 2,692, incident to increase in number of box circuits, fire-alarm system, relieving certain such circuits of overload.

The distribution equipment for the composite signals system (fire-alarm, police-patrol, and telephone) has been affected by the installation of approximately 7¾ miles of underground cables, containing 444 miles of conductors, the withdrawal of 0.3 mile of underground cable, of approximately 2½ miles of conductor, and the withdrawal of approximately 2 miles of aerial cable, of approximately 87 miles of conductor, a net increase of approximately 5½ miles cable, 355 miles conductor. Grand total of composite distribution in service June 30, 1924, 184.498 miles cable, 7,435.958 miles conductor.

This distribution system is inadequate to meet the demands of growth of the system and to provide reasonably safe reserve capacity for emergency.

Further consideration of utilizing radio communication in certain municipal functions has been resumed.

POLES AND OVERHEAD WIRES

The regulation of the erection of poles, the stringing of overhead wires, and of the maintenance of same in safe condition in the streets and other public spaces has been carried on. The operations of the wire-using parties have resulted in an aggregate net increase during the year of 1,097 poles (965 line and 132 guy), bringing the record total of all electric poles on June 30, 1924, to 23,056 (21,577 line, 1,479 guy). The list of pole owners comprises the United States, the District of Columbia, and 16 companies (the steam railroads being lumped as one), one company having become defunct; more than 79 per cent of the poles are owned by, and nearly all the year's increase is by, two of the companies; the United States owns 298 and the District of Columbia 480, a combined Government ownership of less than 3½ per cent of the total; the only change in Government ownership in the year is the increase by 1 by the District of Columbia. The increase of total, 1,097, compares with 1,045 and 912 of the next two preceding years, evidencing continuance of exceptional suburban development; the number of telephone poles in streets and avenues within "the prescribed area" of act of Congress approved June 30, 1902, has been increased by 3. The policy of inducing joint use has again resulted in retarding the increase in number of poles.

ELECTRIC INSPECTION—WIRES AND APPARATUS

In the operations under the act of Congress to regulate electrical wiring in the District of Columbia, approved April 26, 1904, and the regulations thereunder:

The total number of permits issued in connection with the installation of wires and apparatus on private property was 9,495, compared with 9,791, 8,029, and 6,217 in the next three preceding years.

Fees paid to the collector of taxes, $16,264, compared with $16,164, $17,284, and $16,170.

Number of inspections recorded, 21,827, compared with 22,817, 17,284, and 16,170.

Approximate kilowatts represented by permits issued, 17,013, compared with 10,014 in the preceding year.

Reference is made to the reports of the past several years, 1920 in particular, in the matter of need of increased personnel for this service, and the statements and recommendations therein again repeated. The situation, by reason of arrearages, justifiable complaint of delays, hampering of work by persistent solicitations, etc., is scandalous; a service, apparently universally recognized by property owners as valuable and desired, is being poorly rendered because of physical limitations. It is to be noted that while the number of permits and number of inspections are 3 or 4 per cent less this year than last, the average size of the job appears by the record more than 75 per cent greater. It is evident by the record that the saturation point of efficient inspection has been passed.

MISCELLANEOUS

The department made specifications or plans and specifications for and supervised the introduction of electric work (where started) in the following municipal properties:

Completed: Hine Junior High School, clock and bell system; Nurses' home, Gallinger Municipal Hospital, interior fire-alarm system; Anacostia pumping station, motor service equipment.

Under construction: Highway Bridge across Potomac River, control equipment of draw.

Prepared but not started: New Central High School, lighting improvement, auditorium. Workhouse and reformatory, transmission line and apparatus.

The department lent its services to the municipal architect in the preparation of plans and specifications and in supervising the introduction of electric work in the following municipal properties:

Under construction: Armstrong Manual Training School (addition), lighting, power, telephones, clock and bell system. Western High School (addition), lighting, power, telephones, clock and bell system. Charles W. Raymond School, lighting, power, telephone and bell system. Bernard T. Janney School, lighting, power, telephone and bell system. Head house and wharf, Norfolk & Washington Steamboat Co., lighting and telephones. Nurses' home, Tuberculosis Hospital, lighting and telephones.

The department also cooperated with various heads of departments and offices, determining the most advantageous schedule of service rate on new electric installations, canvassing for advantageous changes of schedule with changes of use conditions in old installations, partial audit of vouchers, advice on purchases, testing, etc.

WARREN B. HADLEY,
Electrical Engineer, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF MUNICIPAL ARCHITECT

WASHINGTON, D. C., *September 5, 1924.*

SIR: I have the honor to submit herewith the fifteenth annual report of the office of the municipal architect for the fiscal year ended June 30, 1924.

The work in the municipal architect's office consists of the preparation of plans, specifications, and the superintendence of the construction of all buildings erected by the District of Columbia, consisting chiefly of schools, fire-engine houses, and police stations, and, in addition, the preparation of drawings and estimates for new buildings and repairs to existing buildings for the various municipal institutions, such as the Home for the Aged and Infirm at Blue Plains, the National Training Schools for both boys and girls. Plans of all buildings are submitted to the Fine Arts Commission for approval before work on contract plans is begun.

The repair shop, which is an adjunct to the municipal architect's office, is charged with the upkeep and repair work required for the various buildings of the school system as well as other municipal institutions.

A separate report on the repair shop is forwarded herewith.

The development of plans and the construction of buildings for the reformatory and workhouse at Lorton, Va., also comes under this office, and the report of the engineer in charge is forwarded herewith.

The following buildings were under construction at the time of the submission of the last annual report, and have since been completed:

School building to replace the Smothers School, located between Forty-fourth, Forty-fifth, Clay, and Brooks Streets NE. By the act of June 16, 1921, a sum or $1,544,000 was appropriated for the erection of a number of school buildings and the purchase of sites for buildings. The appropriation made for the erection of a 4-room building to replace the Smothers School was $70,000, but the said act stipulated that the aggregate sum mentioned should constitute one fund for the purposes named. Advertisement for bids for the construction was made November 10, 1921. The bids submitted under this solicitation were rejected, as they exceeded the amount of the appropriation for this building. Readvertisement for bids was made January 15, 1923, and contract was executed March 2, 1923, with David J. Phipps, in the sum of $73,538. The work was completed September 24, 1923, at a cost of $75,654.50. The direct system of heating and ventilating has been installed, but it will be eventually changed to the split system. Cubic contents, 207,640 cubic feet. Cost per cubic foot, 45.3 cents.

Addition to Lovejoy School, located at Twelfth and D Streets NE. By the act of June 29, 1922, $125,000 was appropriated for the erection of an 8-room addition. Contract was executed March 16, 1923, with the Schneider-Spliedt Co., for the construction of the addition, including plumbing, electrical, heating, and ventilating work, in the sum of $115,900. The work was completed October 16, 1923, at a cost of $121,824.60. The split system of heating and ventilating is in use in this building. Cubic contents, 306,510 cubic feet. Cost per cubic foot, 37.81 cents.

Addition to the Garrison School, located on Twelfth Street, between R and S Streets NW. By the act of Congress of June 29, 1922, $140,000 was appropriated for the erection of an 8-room addition. Contract was executed April 17, 1923, with George E. Wyne, for the construction of the addition, including plumbing, electrical, heating, and ventilating work, in the sum of $136,350. The work was completed November 30, 1923, at a cost of $136,604.64. The direct-indirect system of heating and ventilating is in use in this building. Cubic contents, 328,470 cubic feet. Cost per cubic foot, 41.51 cents.

Bancroft School, located at Eighteenth and Newton Streets NW., in the Ingleside section. By the act of June 29, 1922, $140,000 was appropriated for the erection of an eight-room extensible building. An additional sum of $22,260 was appropriated by deficiency act of April 2, 1924. Contract was executed May 11, 1923, with George E. Wyne, for the construction, including mechanical equipment, in the sum of $139,300. The work was completed August 11, 1924, at a cost of $155 584.23. Cubic contents, 330,349 cubic feet. Cost per cubic foot, 42.17 cents.

Langley Junior High School, located on T Street between First and Second Streets NE. The appropriation act of June 16, 1921, authorized the commissioners to enter into contract for this building at a cost not to exceed $300,000, and appropriated $100,000 for the beginning of the erection. An additional $200,000 was appropriated by the act of June 29, 1922. Contract was executed January 23, 1923, for the building, including plumbing, electrical and mechanical equipment work, in the sum of $293,250, with M. Seretto. The work was completed January 4, 1924, at a cost of $295,629.55. The split system of heating and ventilating is in use in this building. Cubic contents, 1,006,792 cubic feet. Cost per cubic foot, 29.13 cents.

Macfarland Junior High School, located on Iowa Avenue between Upshur and Allison Streets NW. The appropriation act of June 16, 1921, authorized the commissioners to enter into contract for this building at a cost not to exceed $300,000, and appropriated $100,000 for the beginning of the erection. An additional $200,000 was appropriated by the act of June 29, 1922. Contract was executed January 23, 1923, for building, including plumbing, electrical, and mechanical equipment work, in the sum of $293,250, with M. Seretto. The work was completed January 4, 1924, at a cost of $293,239.05. The split system of heating and ventilating is in use in this building. Cubic contents, 1,006,792 cubic feet. Cost per cubic foot, 29.13 cents.

Police precinct station No. 12, located at Seventeenth Street and Rhode Island Avenue NE. By the act of March 3, 1917, $40,000 was appropriated for the erection of this station house. By the act of June 29, 1922, an additional $20,000 was appropriated for the purpose. Contract was executed June 15, 1923, with the G. G. Loehler Co., for the construction of this station house, including mechanical equipment, in the sum of $55,376. The work was completed October 23, 1923, at a cost of $56,336.68. The direct system of steam heating is employed in this building, and the direct-indirect in the cells. Cubic contents, 163,200 cubic feet. Cost per cubic foot, 33.93 cents.

Police precinct station No. 7, located on Volta Place, between Thirty-third Street and Wisconsin Avenue NW. Contract was exe-

cuted June 29, 1923, with the G. G. Loehler Co., for making alterations in this station house, in the sum of $7,380. The work was completed October 29, 1923, at a cost of $7,500.

Police precinct station No. 9, located on Ninth Street between E and F Streets NE. Contract was executed June 29, 1923, with the G. G. Loehler Co., for making the alterations in this station house, in the sum of $7,213. The work was completed October 29, 1923, at a cost of $7,313.

Building construction started subsequent to July 1, 1923:

Thomson School, located at Twelfth and L Streets NW. By the act of February 28, 1923, $60,000 was appropriated for beginning construction of a third-story addition to this building, and the commissioners were authorized to enter into contract for said addition at a total cost of not to exceed $135,000. An additional sum of $75,000 was appropriated by the act of June 7, 1924. Contract was executed July 17, 1923, with David J. Phipps, for the construction of the addition, in the sum of $75,269. The work was completed January 17, 1924, at a cost of $75,757.06. Cubic contents, 242,645 cubic feet. Cost per cubic foot, 31.02 cents.

Addition to Armstrong Manual Training School building. By the act of June 29, 1922, $100,000 was appropriated for beginning the erection of an addition to this building, to include assembly hall, additional classrooms, shops, and laboratories, and the commissioners were authorized to enter into a contract for said addition at a cost not to exceed $500,000. An additional $200,000 was appropriated by the act of February 28, 1923, and $200,000 more by the act of June 7, 1924. Contract was executed January 19, 1924, with George E. Wyne for the construction of this addition, including plumbing, electrical, and heating and ventilating work, in the sum of $450,700. This contract time will expire January 19, 1925. The work to date has cost $484, 447.96. The split system of heating will be employed. Cubic contents, 1,409,790 cubic feet. Cost per cubic foot, 31.96 cents.

Addition to Western High School, located at Thirty-fifth and Reservoir Streets NW. By the act of February 28, 1923, $100,000 was appropriated for beginning the remodeling of and the construction of an addition to this building to provide a new assembly hall, gymnasiums for boys and girls, and additional classrooms, and the commissioners were authorized to enter into a contract or contracts for said remodeling and extension at a cost not to exceed $550,000. An additional $450,000 was appropriated by the act of June 7, 1924. Contract was executed February 26, 1924, with Parsons & Hyman for the construction work, including plumbing, electrical, heating and ventilating, in the sum of $478,300. The contract time will expire February 26, 1925. The work to date has cost $478,392. The vacuum, steam direct-indirect system of heating will be used in this building. Cubic contents, 1,609,324 cubic feet. Cost per cubic foot, 29.72 cents.

Mount Pleasant Branch Library, located at Sixteenth and Lamont Streets NW. Amount donated for this building and equipment by the Carnegie Foundation, $200,000. The plans for this building were prepared by Mr. Edward L. Tilton, of New York. Contract was entered into April 18, 1924, with the Schneider-Spliedt Co., for the construction of the building, including plumbing, electrical,

heating and ventilating work, in the sum of $140,140. The contract time will expire February 18, 1925. The work to date has cost $145,450. Cubic contents, 269,629 cubic feet. Cost per cubic foot, 51.96 cents.

Contracts for furniture and equipment have been entered into up to date to the extent of $29,553.

Nurses' home at the tuberculosis hospital, located at Fourteenth and Upshur Streets NW. By the act of February 28, 1923, $35,000 was appropriated for the erection of a nurses' home. Contract was entered into April 11, 1924, with the C. A. Hofferberth Construction Co., for the construction work, in the sum of $33,885. The contract time will expire September 25, 1924, and the work is expected to be completed by that date. The work to date has cost $33,947. The vacuum system of heating will be employed in this building. Cubic contents, 89,999 cubic feet. Cost per cubic feet, 37.65 cents.

Head house at the wharf used by the Norfolk & Washington Steamboat Co., located on Water Street, at foot of Seventh Street SW. The work consists in the reconstruction of the head house which was destroyed by fire January 26, 1924. The amount collected from fire insurance companies, for replacing the improvements at the wharf, was $56,000. Contract was executed April 16, 1924, with V. T. H. Bien, Inc., for removing the fire-damaged portions of the head house and sheds, and for the reconstruction of the head house on a remodeled basis, including plumbing, electrical and heating work, in the sum of $37,621. The contract time will expire August 1, 1924, and the work will be completed September 2, 1924. The work to date has cost $45,066. The steam heating system will be employed in this building.

Charles W. Raymond School, located at Spring Road and Rock Creek Church Road NW. By the act of February 28, 1923, $130,000 was appropriated for the erection of an eight-room extensible building. Advertisement for proposals was made, and proposals were submitted on August 8, 1923, but as all bids exceeded the amount available, contract could not be entered into. By the deficiency act of April 2, 1924, an additional $10,000 was appropriated. Contract was entered into April 22, 1924, with Charles H. Tompkins Co. for the construction, including plumbing, electrical, heating, and ventilating work, in the sum of $133,700. The contract time will expire December 22, 1924, and the work will doubtless be completed at or near that time. The work to date has cost $133,887. The vacuum heating system will be employed in this building. Cubic contents, 380,046 cubic feet. Cost per cubic foot, 35.19 cents.

Bernard T. Janney School, located at Wisconsin Avenue and Albermarle Street NW. By the act of February 28, 1923, $160,000 was appropriated for the erection of an eight-room extensible building, including a combination assembly hall and gymnasium. Contract was entered into July 22, 1924, with George E. Wyne for the construction of the building, including a combination assembly hall and gymnasium, in the sum of $151,837.40. Work was started July 21, 1924, and the contract time will expire May 22, 1925. Cubic contents, 466,490 cubic feet. Cost per cubic foot, 32.55 cents.

Addition and alterations to engine house No. 16, located on D Street between Twelfth and Thirteenth Streets NW. By the act of

June 29, 1922, $5,000 was appropriated for repairs to this engine house. By the act of February 28, 1923, an additional $5,000 was appropriated, and by the act of June 7, 1924, a further sum of $15,000 was appropriated. Bids for the work were received June 18, 1923, but they were rejected as they exceeded the amount available. Contract was entered into August 6, 1924, with the C. A. Hofferberth Construction Co. for additions and alterations in the sum of $15,313. The contract time will expire December 6, 1924.

Besides the preparation of plans and specifications for the above-mentioned buildings, plans and specifications for about 50 other pieces of work, such as heating systems in engine houses, police stations, and school buildings, and equipment for various buildings, were prepared in this office, the contract prices therefor amounting to $145,052.

The contracts entered into by this office for the fiscal year beginning July 1, 1923, and ending June 30, 1924, amounted to a total of $1,542,029.

I wish to call attention to some of the disadvantages of the existing system of asking for appropriations from Congress for buildings. At present it is assumed that a school building can be built for a fixed sum, irrespective of location, condition of site, character of subsoil, and many other essential features affecting the cost and design of the proposed structure.

This scheme has proven both poor policy and poor economy. Properties bought by the District for school sites are often on filled ground of uncertain depth; some are open valleys which must, in addition to being filled, be provided with specially designed footings, as in the recent addition to the Armstrong School, where provision had to be made for crossing a 12-foot trunk sewer involving two exterior and two interior walls, the existence of which was not known until the drawings were begun. Often high embankments must be cut down to provide a suitable level for the building. Frequently it is necessary to make a specially designed building to meet the conditions imposed by the peculiar character of the site, as in the case of the Bancroft School. These are all uncertain factors in determining the cost of a structure and should be provided for in a more definite and businesslike way.

I would therefore recommend that sites be purchased far enough in advance of building requirements to permit of proper investigation as to subsurface conditions, and that the estimates be based on the structure designed to meet each individual condition. This will insure much more comprehensive and accurate estimating on which to base requests for congressional appropriations.

It is generally assumed that the whole of an appropriation is available for the cost of a building, that when $140,000 is appropriated for an eight-room school building it is presumed that no demands other than the building itself will be made upon this money. The following are some of the items which consume a goodly portion of the appropriation: Cost of drafting, inspection, and printing; cost of topographical survey; cost of sewer, water, gas, and electric connections. Charges of various District of Columbia departments, cement house, sand wharf, etc. Grading, seeding, sodding, walks,

and driveways. These items frequently consume 5 per cent of the appropriation.

I believe Congress would be sympathetic with a statement involving all the elements for which an appropriation should be asked to complete in its entirety any given project.

Recent appropriations have not been adequate to fully cover the present cost of building. Since 1921, due to increases in wages and cost of materials, the price of building has advanced 20 to 25 per cent, so that $140,000 is not sufficient to cover the cost of the type of eight-classroom buildings which are being built at the present time. In addition, the Board of Education is constantly increasing the number and character of facilities for these schools, such as principals' offices, teachers' rooms, private toilet facilities, kitchenettes, stage equipment, etc.

The recent bidding on the health school will illustrate the increase in cost. The appropriation is $150,000. The lowest bid received was $170,300. This building was designed in 1921, based on prices at that time. Had it been built at that time it could have been built for 80 per cent of the present bid price, or $136,240, which would have been well within the appropriation. The effect of the conditions noted is that we are compelled to erect buildings stripped of all architectural detail, both inside and out, to leave the grounds unfinished, and omit all walks, driveways, and approaches. Unless these items are provided for in a later appropriation they remain undone or funds must be supplied from the appropriation: "Public schools, District of Columbia, repairs to buildings and grounds."

ALBERT L. HARRIS,
Municipal Architect.

To the ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF REPAIRS

WASHINGTON, D. C., *September 5, 1924.*

SIR: I have the honor to forward herewith my annual report showing the operations of this shop during the fiscal year ending June 30, 1924.

There was appropriated by Congress: For public schools, repairs to buildings, $300,000; all was expended except $139.33. For repairs to engine houses, $20,000, all of which was expended except $3.93. For repairs to station houses, $7,000, all of which was expended except $3. For repairs to police court, $2,000, all of which was expended except $6.61. The foregoing amounts represent the actual cost of 4,921 separate jobs.

Aside from the repairs made out of the appropriation for repairs to school buildings and grounds, we made $16,897.86 worth of emergency repairs upon school buildings, which consisted mostly of repairs to heating plants and lighting systems. These repairs were absolutely necessary, and the only way in which they could be made was to use $1,225 worth of deposits made by the parent-teachers associations for electrical work and to deplete our stock by $15,672.86. The laborers and mechanics used on these extraordinary repairs

were paid from the available balance out of the original appropriation for repairs to school buildings and grounds. The work of the shop was very much hampered by the depletion of the stock, but there was no other course open to us. We have reserved a balance in the appropriation of $139.33 to pay any outstanding bills which may come in on account of excess deliveries of material.

In addition to the work covered by the above appropriations, which are under the supervision of the superintendent of repairs, this shop did $70,146.86 worth of work on various buildings controlled by other departments.

We inspected and repaired steam boilers in over 100 buildings owned by the District.

Modern lighting systems were installed complete or in part in 26 school buildings. It is our intention to equip as many buildings each year not already provided with an adequate lighting system as is possible without neglecting more urgent repairs.

New steam-heating plants were installed in three old school buildings and the hot-air heating plants in all of the schools were overhauled and repaired.

During the year there was turned over to us by the War Department a great deal of surplus war material which was placed in stock and was and will be used upon general repair work wherever practicable. By the use of this material we were able during the past year to make a great many more repairs than we could have done out of the appropriations by Congress.

Our assistant superintendent of repairs and two foremen are still without automobile transportation for their daily inspection of work in progress. Two of our motor trucks have outlived their usefulness. In the estimates for the coming year we have requested that the assistant superintendent and the two foremen be furnished with Ford runabouts and the purchase of two additional trucks, the old trucks to be given in exchange as part payment. Since our foremen have been given automobiles for daily inspection work at least 50 per cent better services have been rendered.

The estimated repairs to school buildings for the fiscal year beginning July 1 were approximately $1,000,000. Congress appropriated $300,000 to do this work. The number of buildings is increasing each year, and the repairs upon the old buildings are also increasing. It was impossible to make any but the most urgent repairs with the appropriation available.

Attention is invited to the urgent need of additional storage room at this shop for both material and our automobiles. At the present time the automobiles are stored at night in the hallways, the tin shop, the machine shop, the stables, and one of them in a fire department garage. We have asked Congress to give us an appropriation to take care of these items in the next appropriation act. There has never been any garage facilities at this shop.

The organization of the shop is the same as it was last year, composed of five annual employees, the superintendent, assistant superintendent, 3 clerks, and from 115 to 225 per diem employees of the various trades. This number increases and decreases according to the season of the year and the amount of work on hand.

We have followed the practice of the last few years in compiling this report. Should more detailed information be desired, we can furnish a detailed statement of the cost of every job, or we can furnish the expenditures under each class of work upon each and every building.

HENRY STOREY,
Superintendent of Repairs.

To the MUNICIPAL ARCHITECT.

Public schools, District of Columbia, 1924, repairs to buildings and grounds

Appropriation		$300,000.00
Stock on hand June 30, 1924		48,252.01
Deposits by various parent-teachers' associations		1,225.00
Total		349,477.01
Expended as follows:		
Carpentering	$77,930.68	
Tinning	18,084.95	
Heating	86,353.28	
Plumbing	17,972.90	
Painting	39,561.65	
Glazing	5,467.59	
Grading and cement work	17,178.62	
Gas and electrical work	47,933.07	
Miscellaneous	224.40	
Gas, electricity, ice, coal, telephones, car tickets, forage (pro rata share for upkeep of shop)	5,219.75	
Engineer department stables (pro rata share)	970.97	
Stock on hand June 30, 1924	32,439.82	
Unexpended balance	139.33	
		349,477.01

NOTE.—The total expenditures for repairs during the fiscal year 1924 amounted to $316,897.86, while the appropriation for repairs was only $300,000. The amount of the expenditures of $16,897.86 in excess of the appropriation was owing to extraordinary emergency repairs which it was absolutely necessary to make. (These emergency repairs were mostly to the heating plants in the various buildings.) We requested a supplementary appropriation to cover these expenditures of $25,000, but Congress did not see fit to grant it; therefore, the only course left for us was to use $1,225 worth of deposits made by the parent-teachers' association and to deplete our stock to the extent of $15,672.86. This depletion of the stock has handicapped the shop greatly. The installing of three new steam-heating plants in old buildings alone cost $26,772, which had to be paid for out of the repair fund.

Fire department, District of Columbia, 1924, repairs to engine houses

Appropriation		$20,000.00
Expended as follows:		
Carpentering	$6,937.89	
Tinning	1,137.17	
Heating	1,963.03	
Plumbing	1,426.32	
Painting	6,475.89	
Glazing	136.51	
Cement paving and grading	1,060.74	
Gas and electrical work	270.19	
Miscellaneous	139.25	
Pro rata for upkeep of shop, telephones, ice, fuel, gas, and electricity	449.08	
Balance	3.93	
		20,000.00

Metropolitan police, District of Columbia, 1924, repairs to stations

Appropriation		$7,000.00
Expended as follows:		
Carpentering	$1,143.69	
Tinning	191.01	
Heating	2,367.03	
Plumbing	486.27	
Painting	2,325.36	
Glazing	37.88	
Cement work	51.51	
Gas and electrical work	137.55	
Miscellaneous	91.89	
Pro rata upkeep of shop, forage, ice, fuel, gas, and electricity, telephones	164.81	
Balance	3.00	
		7,000.00

Police court, District of Columbia, 1924, repairs to buildings

Appropriation		$2,000.00
Expended as follows:		
Carpentering	$424.85	
Plumbing	518.74	
Painting	822.47	
Glazing	18.95	
Steam fitting and ironwork	51.92	
Electrical work	156.46	
Balance	6.61	
		2,000.00

Outside appropriations, 1924

In addition to repair work on school buildings, engine houses, police stations, and the police-court buildings, we did work on outside appropriations as below:

Juvenile court	$32.05
Municipal court	181.58
Schools (various)	3,372.20
Community centers	1,617.54
Playgrounds	2,033.04
Police, contingent	651.05
House of detention	605.80
Harbor patrol	24.69
Fire, contingent	426.16
Repairs to fire boat	28.48
Health department (various)	1,085.38
Water department	116.95
Gallinger Hospital, repairs	722.75
Tuberculosis hospital	558.44
Industrial home school, colored	1,986.62
Industrial home school (various)	2,515.53
Municipal lodging house	658.11
National Training School for Girls	1,152.62
Public convenience stations	648.54
Electrical department	320.64
Public Library	380.96
Markets	1,986.63
Coroner	95.59
Charities	86.61
Damages	68.49
Work on various construction jobs under continuous appropriation	48,790.41
Total	70,146.86

NOTE.—The above represents work which was done by this shop during the fiscal year 1924 upon written request from the officials in charge of the various appropriations.

INSPECTION OF STEAM BOILERS

During the fiscal year 1924 the District of Columbia repair shop inspected and repaired the steam boilers in 100 buildings owned by the District of Columbia.

REPORT OF CONSTRUCTING ENGINEER, DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY

LORTON, VA., *August 26, 1924.*

SIR: I have the honor to submit herewith report of the operations of the construction division of the workhouse and the reformatory for the fiscal year ending June 30, 1924. This report describes briefly the various construction projects in progress with some building costs. More detailed information can be furnished on request.

The principal work done during the past fiscal year consisted of construction of permanent buildings at the reformatory, continuing construction on the industrial railroad, starting the construction of permanent buildings at the workhouse, and a number of repair jobs at both institutions.

REFORMATORY BUILDINGS

On June 30, 1924, there were 14 buildings completed or under construction, consisting of 5 shops, 4 dormitories, 2 disciplinary dormitories, 1 washhouse, 1 boiler house, and 1 dining hall and kitchen. Of these the shops, disciplinary dormitories, boiler house, and 2 dormitories are practically complete, except for some interior finishing. Three of these buildings are now in service, the 2 disciplinary dormitories are ready for use, and it is planned to have 2 dormitories ready to occupy in about four months. The other dormitories under construction have brickwork to window-sill height, and about one-half the foundation is in place for the dining room and kitchen building.

The steam-heating mains were installed in part of the tunnel system and heat turned on in three shops. The following figures show the approximate cost of the various types of buildings. These figures have been determined from the cost of bought material and hired labor actually used in each building. The estimated cost of completing the interior work in buildings is included in these figures.

Shop with basement	$9,800
Shop without basement	5,500
Disciplinary dormitory with cells	17,800
Disciplinary dormitory without cells	8,600
Dormitory	7,600

As the dining hall and kitchen building will probably cost about $50,000, sufficient money should be provided so as not to retard construction on this building.

Besides the permanent construction work considerable repair and remodeling work was done to the heating system of the temporary buildings to insure more efficient operation and effect a saving of coal.

INDUSTRIAL RAILROAD

Work on this project was somewhat retarded on account of the bad weather during the early spring, but at the close of the fiscal year the work was progressing more rapidly, and before winter it should be possible to haul all necessary building material to the new reformatory site over this road. During the past year the bridge over the main highway was constructed and about 4,600 feet of track laid, most of which is ballasted and ready for operation. Another locomotive is urgently needed, as the hauling of supplies and the increasing demands for construction materials will tax the locomotive now in service very heavily. A locomotive driven by a gasoline engine that will answer our requirements could be obtained for less than $5,000. Construction should continue on this road to provide a connection to the main line of the Richmond, Fredericksburg & Potomac Railroad. With such connection completed a great saving in the cost of transporting supplies will be effected, especially in the delivery of coal.

WORKHOUSE BUILDINGS

Construction was started in June on the first dormitory of the permanent buildings. This group consists of six dormitories, four shop buildings, a hospital and disciplinary dormitory, a recreation hall, a commissary, a bathhouse, and an administration building. Under favorable conditions it should be possible to complete one dormitory, and have two other buildings about half complete at the end of the present fiscal year. Special attention should be given the heating system and other mechanical equipment. With new boilers and a modern heating system in service at least 20 per cent of the coal now used should be saved.

BRICK PLANT

The brick plant, our main industry for manufacturing building material, should be put in first-class condition throughout, to insure continuous operation during the entire year. After new machinery is installed it is suggested that sufficient funds be obtained each year for necessary equipment and construction to remodel this plant and increase its output.

Other work done during the year included rebuilding the electrical transmission line and preparing same for higher voltage, preparing some plans and data for improvements to the water system, and making technical reports on establishing new industries, etc.

Respectfully submitted.

HERBERT R. HAAR,
Constructing Engineer.

To the MUNICIPAL ARCHITECT.

REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT

WASHINGTON, D. C., *September 12, 1924.*

SIR: The annual report of the water department for the fiscal year *ended June 30, 1924,* is submitted herewith.

The total length of cast-iron water mains of various sizes laid during the year is 75,611 feet, or 14.30 miles. The total length of water mains in service of all sizes is 688 miles.

At this point I wish to call attention to the serious handicap under which the department is working in connection with this class of work, it being impossible, with the limited appropriation for extension of the distribution system, for the department to keep pace with the demands for service mains to building operations.

The mean daily water consumption for the year is 64,069,344 gallons, giving a mean daily per capita consumption of 131.57 gallons, the city population being taken as 486,936.

The most important feature of the water main construction, designed to relieve Brookland and the northeast suburban communities, was the completion of one link of a trunk main, 30 inches in diameter, extending from First and Adams Streets to Rhode Island Avenue and Eighth Street NE. This has afforded considerable relief through connections with existing water mains and those laid to meet the new main. This branch of work is more fully outlined under the report on engineering and construction.

Improvements carried on at the District pumping station include the replacement of one Westinghouse engine, which was coupled to a 75-kilowatt generator with an Ames unaflow engine. There were minor changes in the outflow piping at the pumping station to enable us to augment a lower water service with a pump which normally runs on a higher service. This is a very valuable asset in case a pumping unit should suddenly break down.

At the Anacostia pumping station there was installed a 3,000,000-gallon, direct-connected, electric-motor-driven, centrifugal pump, manufactured by the De Laval Co. This pump is in addition to the present plunger-type pump supplying the first high service of Anacostia and Congress Heights.

The pumpage for the fiscal year was 293,107,530 gallons more than in 1923. The greatest amount pumped in one day occurred September 4 and was 39,840,340 gallons. The least pumped in one day was August 19 and amounted to 30,461,720 gallons. The total operating expenses (including overhead) of pumping 1,000,000 gallons of water into the water mains was $10.01. This is a slight increase over the cost for the previous year.

A marked extension of the Anacostia first high service was completed to the high area adjacent to Deanwood and in the vicinity of the Smothers School, situated at Forty-fourth and Brooks Streets NE.

Detailed reports of the several subdivisions of the department are on file in the office of the superintendent, much of which could not be included here on account of order limiting alloted space.

I wish here to record my appreciation of the loyal and efficient services rendered by the employees under my supervision.

J. S. GARLAND,
Superintendent Water Department.

To the ASSISTANT ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION

The most important work of the year was the laying of a trunk 'ater main which was authorized by act of Congress.

This water main constitutes one link in the system which will rovide adequate water service for the northeast section of the city omprising all of Brookland and adjacent communities. This main as been needed for many years and the urgency of the case has een constantly pointed out, but owing to press of other work and imited funds the appropriation was not granted until the present ime.

The length of this line was nearly 6,000 feet and its size 30 inches n diameter. The route traversed was as follows:

Adams Street NW. from Flagler to North Capitol Streets, North Capitol from Adams to V Street, V Street from North Capitol Street o Rhode Island Avenue, and Rhode Island Avenue to a point about 00 feet east of the railroad crossing.

The laying of this water main even this far has had a very marked nfluence toward stabilizing the water pressures in Brookland and djacent areas as compared with those maintained before this work as done. It will suffice to say that the extreme high places were ithout water whenever a sudden draft or maximum consumption ccurred. Recent records show that the points of high elevation are ow constantly served, but they still experience a considerable slump n the water pressure occasionally.

The next link in this important work will be during the coming scal year of 1924–25, for which an appropriation has been made to xtend the above-mentioned main in Rhode Island Avenue as far s Sixteenth Street NE.

Another trunk water main was installed in the west side of North Capitol Street from K Street to Florida Avenue. It is 16 inches n diameter. This is a much-needed improvement to reinforce the ravity system adjacent to this important street.

During the year this department was called upon on seven occaions to repair broken sections of the 36-inch water main through hich condensing water is pumped from the Potomac River to the Inited States Capitol power plant.

Owing to the progress in making a fill along the north side of anal Road at College Pond it was found necessary to remove the rched water mains spanning the small creek and replace them with nderground lines. If these water mains had been allowed to reain, an excess amount of earth would have been placed above the ains, covering them to a depth which would render them very ifficult of access.

Another water main of importance was the replacing of an old inch water main in the south side of K Street between Seventeenth nd Eighteenth Streets with new 12-inch pipe. The latter size was ecessary in order to serve several large apartments and for general re protection. The old 4-inch main was badly corroded and partly lled with sediment accumulated during its long service.

An important change in the water service in the Deanwood section was made for the benefit of the higher areas, and a considerable territory was taken off the gravity service and is now served by the first high Anacostia service.

Other improvements consisted in laying 12 and 8 inch water mains, the summary of which in detail will be found in tabulated form in this report.

The construction forces engaged in water-main extensions, erecting fire hydrants, placing valves, installing cast-iron water services to buildings, 3 inch and over, consisted of 4 gangs of about 25 laborers and 2 gangs of about 4 laborers, each superintended by a foreman. In all, nearly 14.30 miles of water mains were laid.

Installation and maintenance of water meters

District of Columbia meters installed at new locations (inside)	2,107
District of Columbia meters installed at new locations (outside)	546
Total number of meters installed	2,653
District of Columbia meters removed and replaced:	
Not registering	2,714
Leaking	1,114
Lack of pressure	164
For test	23
On account of noise	53
Defective registers	225
For building purposes	20
Abandoned to new services	94
Total number of District of Columbia meters removed and replaced	4,407
District of Columbia miscellaneous:	
Repaired in place	323
Abandoned and removed	191
Adjusted to grade	141
Private meters:	
Not registering	341
Reset with repairs	385
Repaired in place	85
Leaking	133
Lack of pressure	40
Reported for repairs and found O. K	7
Removed for test	5
Defective registers	4
District of Columbia meters set temporarily in place of private meters	186
District of Columbia meters removed and private meter set	238
Miscellaneous:	
Replaced covers on curb boxes	227
Replaced frames and covers	175
Curb boxes adjusted to grade	94
Replaced curb boxes	11
Inspection of service pipes	3,829
Number of taps installed	2,867
Taps removed and main plugged	53
Number of premises paying flat rate	10,104
Number of premises paying meter rate	70,159
Total	80,263
Number of meters not registering	9,820
Percentage of services in use metered	87.41

STEAM ENGINEERING

lowing is a summary of the work done at the District tation for the year:

ɔed, figured from plunger displacement:		
gh service	gallons	7,077,768,660
high service	do	3,710,795,450
igh service	do	1,592,042,000
	do	12,380,606,110
high service	do	101,139,133
l burned	tons	8,187
nder oil used	gallons	642
ine oil used	do	1,467
nk case oil used	do	392
ered oil used	do	399
bine oil used	do	1,005
ase used	pounds	547
ste used	do	1,080

ılar force employed at this station in the daily operation mping engines, boilers and auxiliaries, cleaning of ma- c., consisted of three crews of three engineers in charge, stant engineers, three firemen, three oilers, and three orking in eight-hour alternate shifts, "six days on and ff" per week, being relieved on "days off" by an extra rew.

fourth high service the water is pumped from the Reno which is supplied by the third high service pumps, to an ınk by gasoline engines and triplex pumps. This ma- operated daily by three enginemen who work on eight- s. The water pumped for this service during the year 9,133 gallons, or a mean of 276,336 gallons daily.

ıcostia pumping station has been operated without inter- ring the year, pumping to the three towers supplying the of the Anacostia River. This station is taken care of by emen who work on eight-hour shifts. The water pumped rvice during the year was 189,341,450 gallons, or a mean gallons daily.

l pumpage for the year at the District pumping station 7,330 gallons more than in 1922–23. The greatest amount one day (September 4) was 39,840,340 gallons; least in August 19) was 30,461,720, and the average dynamic head mps was 137.78 feet. The total operating expenses (ex- erhead) chargeable to pumping was $123,878.31, as against in 1922–23, making the total operative cost (excluding of pumping 1,000,000 gallons of water into the mains his is $0.43 per million gallons more than in 1922–23, ıly due to the increased cost of labor chargeable to pump- ıverage cost of coal per ton for the year was $7.29, which ess than in 1922–23.

ion duty for the year was 80,734,682 foot-pounds per 100 coal. This is 2.6 per cent more than the duty obtained preceding year, and represents an annual saving of ap- y 204 gross tons of coal. This saving in coal may be

attributed almost entirely to the improved economic pumping operations.

Especially important work done during the year includes (1) replacement at this station (in August) of the old Westinghouse engine for driving the 50-kw. shop generator with an Ames unaflow engine, (2) installation of the connection between the second and third high services (which enables us to operate the third high service pumps on the second high service), and (3) installation of the 3 m. g. d. automatically controlled motor-driven De Laval centrifugal pumping unit on the first high service at the Anacostia station (which work was completed on June 30, 1924).

WATER SURVEYS

Activities of this division during the year were confined principally to routing disposal of complaints and the cutting off of abandoned service pipes. The work is classified and prosecuted under headings of "Underground leakage investigations" and "Complaint investigations."

Due to lack of sufficient number of employees it has been impossible to continue the prosecution of routine water surveys for the detection and prevention of underground waste and illegitimate water consumption. The numerous complaints of leaks, water in cellars, low pressure, no water, and of other conditions demanding immediate attention have so occupied this division as to require practically all of the employees upon this work. It was found impracticable to make any systematic surveys for leakage due to the intermittent nature of periods when personnel was available for this work. The nucleus of the original water survey organization was held intact, however, ready for expansion into efficient force when conditions permit. The abandonment of old service pipes no longer in service was accomplished by employees of this division with an encouraging speed. The requests for these abandonments have been accumulating for years and the work is seriously in arrears. The division now has eight men constantly on this work, and it is felt that eventually it can be brought up to date. The past summer has brought in a great number of these requests, however, and the exact status of this work is doubtful. At various times when it has been possible to do so inspectors have been assigned to miscellaneous underground leak investigations and the result of this work is tabulated in the proper statement herewith. The small quantity of leakage shown is due to the decreased activities and not to decreased leakage within the city. There is ample evidence, upon the contrary, that underground conditions are becoming much worse and that eventually the underground surveys must be continued.

Special attention was given to the water consumption at Fort Myer, where a shortage was apparent, and waste of water in the Washington Navy Yard, where the maintaining of proper control of the careless waste is a constant duty of this division. The work at Fort Myer embraced a complete analysis of the day and night flow and the results of this work were fully covered in a special report dated October 30, 1923. The work at the navy yard consisted principally of continuous scrutiny of the night rate of flow and night

inspections when the rate was found above our previously determined minimum.

This division maintained a constant reading of meters and inspection of fixtures in all schoolhouses, police stations, and engine houses. Leaks and wastes in these institutions were practically eliminated by this work.

The water survey division cooperated fully with other divisions of the water department and with the Washington Aqueduct in the matter of supplying data upon flow into Government institutions, pressures at critical points, particularly in the Brightwood service area, pipe capacities, and in other special cases as requested.

The water survey shop was operated continuously upon routine repairs to equipment, special work upon instruments used by this and other divisions of the department, and much experimental work was performed in the matter of perfecting flow-measuring apparatus used constantly by this division.

Full details of all work are given in the tabulated statements which are transmitted each year in uniform style to permit proper comparisons to be made of the yearly results.

STOREKEEPING

The cost of operating the storeroom for the year was 2.61 per cent of the value of material issued and equipment disposed of.

A comparison of the percentage of cost for operating the storeroom for the past 10 years ranges from 4.67 per cent in 1915 to 2.61 per cent in 1924.

The value of material issued and equipment disposed of during the year was $535,903.99. Collected, stored, weighed, counted, and delivered to the contractors old materials to the value of $456.11.

All tools and equipment worn out during the year were collected, inspected, and condemned by the survey officer and disposed of as ordered by the auditor. The value of equipment received and issued during the year was as follows:

Material:	
Receipts	$516,128.50
Issues	513,713.55
Equipment:	
Receipts	57,556.28
Issues	22,190.44

The following table shows comparative difference in the value of material and equipment received and issued during the past 10 years:

Year	Material		Equipment	
	Receipts	Issues	Receipts	Issues
1915	$244,152.74	$254,833.36	$170,140.38	$1,915.94
1916	255,174.17	254,945.05	23,461.60	30,379.82
1917	340,157.19	331,880.02	10,732.97	4,748.69
1918	380,113.88	321,578.56	42,414.29	5,439.46
1919	343,282.99	338,328.15	22,804.59	16,833.94
1920	283,213.37	290,998.74	9,452.00	9,369.69
1921	394,546.32	418,566.70	21,863.56	16,038.57
1922	350,242.76	350,837.75	36,673.28	23,673.80
1923	459,178.79	468,273.22	21,430.07	88,000.33
1924	516,128.50	513,713.55	57,556.28	22,190.44

The value of material on hand at the close of the year was $178,154.32, and the value of equipment in stock and in service at the close of the year was $681,629.04.

TRANSPORTATION

The transportation equipment consists of 45 automobile trucks, ranging in capacity from a light Ford roadster to a 5½-ton Mack truck. The number of trucks has not been increased during the year, but 12 old trucks were traded in part payment for 12 new trucks.

The following transportation was furnished daily to the various subdivisions: Construction forces, 17 trucks, 8 chauffeurs; engineer division, 2 trucks, 1 chauffeur; leak-repair forces, 2 trucks, 1 chauffeur; valve division, 3 trucks, 1 chauffeur; construction foreman, 1 truck; fire-hydrant division, 2 trucks; revenue division, 5 trucks; water-survey division, 6 trucks; street-hydrant division, 1 truck, 1 chauffeur; superintendent, 1 truck.

Hauled for use by the construction forces and for storage in the property yards 24,620,700 pounds of material, about 12,310 tons. Hauled from construction jobs to various dumps, 2,175 loads of dirt, about 7,613 cubic yards. Hauled from the pumping station to the various jobs and dumps 404 loads of ashes, about 2,020 cubic yards.

The charges for use of our trucks on general hauling, per eight-hour day, are about one-half the rates charged by contractors: 5½-ton truck, with driver, $16; 1-ton truck, with driver, $9. While these rates are only about one-half the rates charged by contractors, the total charges for use of our heavy trucks during the year exceeds the cost of maintenance and operation by $1,783.89. The cost of maintenance and operation of these trucks included gasoline, oils, grease, tires, miscellaneous supplies, material, and labor expended in making repairs, garage rent, drivers' wages, and a charge for depreciation.

TABLE I.—*Cost of work done by the water department for the year ended June 30, 1924*

Heads of expenditure	Per diem and salaries	Material expended cuts and transportation	Total expenditures	Charge to general account		Hauling and deposit accounts, Dr.
				Maintenance	Extensions	
Water surveys (detection of leaks)	$16,974.54	$1,132.10	$18,106.64	$18,106.64		
Maintenance of meters	34,059.90	42,149.53	76,209.43	76,209.43		
Installation of meters	8,117.06	4,878.64	12,995.70		$12,995.70	
Office of water registrar	66,773.39	6,588.57	73,361.96	73,361.96		
Inspection and repair of services	19,792.81	2,850.96	22,643.77	22,643.77		
Tapping water mains	6,030.27	10,897.85	16,928.12		16,928.12	
New services installed	58.98	49.37	108.35		108.35	
Engineering (field survey)	24,798.74	1,747.86	26,546.60		26,546.60	
Hauling account	19,110.39	5,584.17	24,694.56			$24,694.56
Operation and repair of valves, fire hydrants, etc	25,652.60	3,478.22	29,130.82	29,130.82		
Installation of fire and public hydrants	6,023.92	20,062.74	26,086.66		26,086.66	
Water mains laid	108,119.75	207,256.23	315,375.98		315,375.98	

TABLE I.—*Cost of work done by the water department, etc.*—Continued

Heads of expenditure	Per diem and salaries	Material expended cuts and transportation	Total expenditures	Charge to general account		Hauling and deposit accounts, Dr.
				Maintenance	Extensions	
Repairs to leaks	$24,466.51	$8,467.52	$32,934.03	$32,934.03		
Maintenance of reservoirs, lodges, and towers	5,497.78	2,180.29	7,678.07	7,678.07		
Care of grounds	6,828.14	186.70	7,014.84	7,014.84		
Repayment and deposit work	18,196.67	34,979.29	53,175.96			$53,175.96
Replacement work, lowering mains, etc	11,360.03	9,456.17	20,816.20	20,816.20		
Plans, estimates, and tests	17,311.32	600.32	17,911.64		$17,911.64	
Care of Bryant Street pumping station	23,484.40	3,689.74	27,174.14	27,174.14		
Operation and repair pumps, Bryant Street station	46,938.54	86,246.38	133,184.92	133,184.92		
Operation and repair pumps, Reno station	5,754.01	598.86	6,352.87	6,352.87		
Operation and repair pumps, Anacostia station	7,438.71	3,869.76	11,308.47	11,308.47		
Shopwork	21,094.05	23,184.40	44,278.45	44,278.45		
Furnished other District of Columbia offices	4,819.75	6,085.99	10,905.74	10,905.74		
Gross expenditures	528,702.26	486,221.66	1,014,923.92	521,100.35	415,953.05	77,870.52

SUMMARY

Expenditures:		Charge to—		Per cent
Per diem pay rolls	$434,369.03	Maintenance	$521,100.35	55
Salary pay rolls	94,333.23	Extensions	415,953.05	45
Total services	528,702.26			
Material expended, cuts, etc	486,221.66			
Gross expenditures	1,014,923.92			
Less transportation and repayment credits	77,870.52			
Net expenditures	937,053.40	Total	937,053.40	100

TABLE II.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work*

Diameter	In service June 30, 1923	Laid during year ended June 30, 1924	Abandoned during year ended June 30, 1924	In service June 30, 1924
3-inch ... linear feet	87,021	1,121	438	87,704
4-inch ... do	155,807	1,120		156,927
6-inch ... do	1,469,245	938		1,470,183
8-inch ... do	1,036,677	50,405	100	1,086,982
10-inch ... do	9,107	7		9,114
12-inch ... do	430,417	12,901	1,179	442,139
16-inch ... do	31,213	3,176		34,389
20-inch ... do	141,511	25		141,536
24-inch ... do	36,133	8		36,141
30-inch ... do	58,595	5,910		64,505
36-inch ... do	59,457			59,457
42-inch ... do	23			23
48-inch ... do	44,172			44,172
75-inch ... do	600			600
Total	3,559,978	75,611	1,717	3,633,872
Stop valves	11,573	292	68	11,797
Fire hydrants	3,918	160	36	4,042
Public hydrant	274	21	4	291
Sanitary fountains	23	0	0	23
Horse fountains	155	0	1	154
Public wells	44	0	0	44

TABLE III.—*Statement of length and costs of water mains laid from July 1, 1878, to June 30, 1924, paid from water department funds*

Diameter	In service June 30, 1923	Laid during year ended June 30, 1924	Abandoned during year ended June 30, 1924	In service June 30, 1924
3-inch ..... linear feet	77,171	7	438	76,740
4-inch ..... do	116,421	82		116,503
6-inch ..... do	1,079,373	391		1,079,764
8-inch ..... do	976,533	49,584	100	1,026,017
10-inch ..... do	6,739	7		6,746
12-inch ..... do	374,143	8,664	1,179	381,628
16-inch ..... do	24,062	3,176		27,238
20-inch ..... do	130,409	25		130,434
24-inch ..... do	15,653	8		15,661
30-inch ..... do	21,028	5,910		26,938
36-inch ..... do	38,244			38,244
42-inch ..... do	23			23
48-inch ..... do	14,309			14,309
Total	2,874,108	67,854	1,717	2,940,245

Total cost to June 30, 1923	$4,801,863.63
Total cost for year ended June 30, 1924	315,375.98
Aggregate cost to June 30, 1924	5,117,239.61

REPORT OF THE WATER REGISTRAR

WASHINGTON, D. C., *August 28, 1924.*

SIR: I submit herewith the annual report of the revenue and inspection branch of the water department, showing in detail the work accomplished during the year ended June 30, 1924.

WATER RATES

The rate for domestic purposes is charged according to stories and front feet. On all tenements two stories high with a frontage of 16 feet or less, $6.25 per annum; for each additional front foot or fraction thereof greater than one-half, 39 cents; for each additional story or part thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume of business, and water facilities, and rate from $1 to $25. If the flat rate on business establishments reaches $25 or more, the owner or occupant is required to install a water meter at his own expense.

A minimum rate of $5.65 will be charged against all consumers supplied with water through meters, which allows the use of 7,500 cubic feet of water during the year; water used in excess thereof will be charged for at the rate of 5 cents per 100 cubic feet.

TABLES

The table of comparative revenues shows a total collection of $1,146,321.92.

Table 1 shows statement of cash receipts of the water fund.

Table 2 shows comparative statement of revenues.

Table 3 shows general information.

GEO. W. WALLACE,
Water Registrar.

The SUPERINTENDENT, WATER DEPARTMENT.

TABLE 1.—*Statement of collections*

Vater rents:	
Flat rate	$88, 519. 31
Meters	941, 671. 65
Building purposes	5, 667. 93
Total	1, 035, 858. 89
Vater-main tax, principal and interest	109, 843. 31
Iiscellaneous receipts	619. 72
Total	110. 463. 03
Total receipts	1, 146, 321. 92
'aps and stop cocks	15, 596. 91

NOTE.—Increase of $60,553.60 in water rents for the year ending June 30, 924.

'ABLE 2.—*Statement of cash receipts of the water fund for the fiscal years from June 30, 1912, to June 30, 1924*

Year	Water rents	Water-main tax, principal and interest on same	Miscellaneous receipts	Year	Water rents	Water-main tax, principal and interest on same	Miscellaneous receipts
)12	$545, 405. 47	$122, 458. 81	$2, 817. 50	1921	$984, 055. 23	$78, 989. 83	$1, 557. 73
)13	640, 008. 64	138, 693. 57	3, 153. 81	1922	943, 182. 45	86, 425. 56	2, 455. 49
)14	646, 296. 15	86, 379. 21	4, 253. 20	1923	975, 305. 29	128, 372. 29	959. 21
)15	638, 861. 89	66, 107. 56	3, 532. 77	1924	1, 035, 858. 89	109, 843. 31	619. 72
)16	624, 882. 18	64, 647. 80	1, 761. 39				
)17	636, 664. 31	61, 990. 43	2, 019. 58	Total	9, 938, 229. 69	1, 049, 858. 45	26, 235. 45
)18	714, 388. 28	34, 649. 46	458. 96				
)19	782, 159. 36	28, 179. 43	1, 482. 58	1925 [1]	1, 040, 000. 00	100, 000. 00	1, 000. 00
)20	771, 161. 55	43, 121. 19	1, 164. 01	1926 [1]	1, 045, 000. 00	100, 000. 00	1, 000. 00

[1] Estimate.

TABLE 3.—*General information*

	Cubic feet
'onsumption of water through meters:	
District meters	723, 189, 000
District meters in municipal buildings	62, 609, 400
Private meters	898, 330. 20.)
Private meters in charitable institutions	27, 388, 600
Total	1, 711, 517, 200

Meters in service	In use June 30, 1923	Installed 1924	Abandoned 1924	Total in use June 30, 1924
istrict meters	63, 753	2, 603	283	66, 073
istrict meters in municipal buildings	264			264
rivate meters	3, 354	309	20	3, 643
rivate meters in charitable institutions	196	11	6	201
Total	67, 567	2, 923	309	70, 181

verage cost of reading meters	$0. 21
verage cost of computing and making bills	$0. 225
verage payments for premises in which meters were installed	$7. 57
verage payment for flat-rate accounts	$8. 76
remises receiving an allowance of free water:	
Number of institutions	171
Number of meters	201
Cubic feet of water consumed	27, 388, 600
Allowance of free water	37, 605, 000
Number of institutions exceeding allowance	25

Water services:	
In use June 30, 1923	77,679
Installed, 1924	3,013
Total	80,692
Abandoned, 1924	407
In use June 30, 1924	80,285
Metered	70,181
Not metered	10,104
Percentage of services metered	87.41

REPORT OF THE SANITARY ENGINEER

WASHINGTON, D. C., *August 30, 1924.*

SIR: The annual report of the sanitary engineer, covering the fiscal year ended June 30, 1924, is submitted herewith.

On June 3, 1924, an agreement was formally entered into between the Commissioners of the District of Columbia and the Washington Suburban Sanitary Commission as to a reciprocal provision for the connection of the sewerage systems in the State of Maryland bordering the District of Columbia and those of the District of Columbia. This agreement was in accordance with act of Congress approved September 1, 1916. No sewage connections to or from Maryland have as yet been made under this agreement.

A bill, concurred in by the commissioners, was during the year introduced in the House of Representatives by Mr. Moore of Virginia, to authorize the Arlington County, Va., sanitary district to connect its sewerage system with the sewerage system of the District of Columbia. At the time of the adjournment of Congress this bill was with the Committee on the District of Columbia.

Under the 1919 District appropriation bill there was appropriated the sum of $60,000 for the purchase or condemnation of the necessary land for a sewage-treatment works. The site selected for these works is a portion of the Bellevue tract, in the vicinity of the Home for the Aged and Infirm. During the fiscal year 1919, 34.6 acres of land was acquired, and after long court delays there was finally consummated during the fiscal year 1924 the purchase of two additional parcels of land aggregating 33.18 acres. The sum paid for these two latter tracts was $29,147.52. It is felt that continued efforts should be made to acquire the 10-acre parcel 253/2, as well as reach an agreement with the Baltimore & Ohio Railroad to have them relocate their trackage now traversing District property recently acquired for these sewage-treatment purposes. The time can not be far distant when some preliminary treatment must be given the sewage of Washington, rather than discharge it, as at present, in its raw state into the Potomac River. Based on the latest estimated population for the District of 486,936, the dilution obtaining in the Potomac, based on the flow in cubic feet per minute per thousand of population, is getting dangerously low. For the 17-day period, October 11–27, 1923, the dilution figure was 210, and during this period there was a 7-day period from October 14–20, when the dilution figure dropped to 152. The minimum figure obtained on December 23, 1923, with a dilution of but 122. The above figures

have a considerable factor of safety in that, due to large rural communities, the entire population is not now contributary to the sewer system.

A new departure on the part of the District that developed during the year was allowing the installation of fuel-oil tanks in public space. This concession was made in order that the users of fuel oil might have the same privilege as then enjoyed by coal burners, who were permitted to construct coal vaults in public space.

As the result of a more liberal appropriation, the division was better able to meet the demand for service sewers than during the year 1923, although the demand for this class of sewers is still considerably greater than the available appropriations will permit constructing. At the close of 1924, the service sewers ordered and not built amounted to $115,804. The appropriations made available for interceptors of the sewage-disposal system are, it is felt, still decidedly inadequate.

There has been prepared in the office of the sanitary engineer a tentative five-year construction program, with the view of striving to bring the sewerage system of the District to date by June 30, 1929. Under this program there would be required an annual construction appropriation during the next four years of approximately $1,800,000. In comparison with these needs, it might be mentioned that the construction appropriations for the fiscal year 1925 are but $805,000. The above estimated needs for sewer construction are in addition to any sums which might be required in this period for a sewage-treatment plant.

As the result of a review by the personnel classification board of the professional and subprofessional services of the District, a more equitable classification was arrived at than as originally classified. This review increased the grade of 15 employees of this division out of a total of 43 classified under this heading. In this connection, it is felt that of the 18 employees of this division classified under the clerical, administrative, and fiscal service, about 11 should be advanced in grade in order to put this branch of the work on a par with the other services.

The following is a summary of the sewerage and sewage-disposal systems, as of June 30, 1924:

Length of sewerage system (miles):		
Main sewers	156.04	
Pipe sewers	635.19	
		791.23
Length of sewage-disposal system		37.52
Total length		828.75
Cost of sewerage system		$16,432,298.47
Cost of sewage-disposal system		6,015,232.96
Total cost		22,447,531.43

The sanitary engineer has to acknowledge the efficient and loyal support accorded him by the employees of the sewer division. Any accomplishments achieved during the year were made possible by their cooperation.

A brief résumé of the year's activities follows.

OFFICE ENGINEERING

The work of this section comprises the computing, designing, and drafting work incidental to studies for new construction, repairs, or improvements, and for future extensions of the system. This section also has charge of the map work of the division, the file system of drawings, and is charged with the duty of furnishing the public information concerning the sewerage system, particularly as to the availability, function, location, and size of existing sewers as required in connection with building activities. In addition, this section answers or indorses all letters and jacketed files requesting sewer construction.

In connection with underground construction, public-service corporations, there is involved the detailed determination of locations of new extensions of gas mains, electric, telephone and telegraph conduits, with their accessories, as well as supervision of the work done under permits therefor, and the accurate location of all work performed.

During the year, 1,967 plumbing slips were issued as to availability or nonavailability of sewers. There were handled 743 jacketed files, each requiring an indorsement or the preparation of a letter. Of the above files 350 were requests for construction, each case requiring detail work as to sewer sizes and locations, estimated cost, and the preparation of an accompanying plat or blue print showing all pertinent facts. Plats numbering 364 were forwarded to the assessor covering cases where new subdivisions were made abutting existing service sewers, where houses on parcel property were connected to a service sewer, where trunk sewers were construed as service sewers, and as advance notice of pending sewer assessment. In connection with the paving of streets and sidewalks, 466 studies were made as to sewer requirements in order to avoid the cutting of new surface work. In that the establishment of new or the modification of existing street and alley grades affects the existing and future sewer construction, it has been necessary during the year to study 200 cases of proposed surface grades. Incidental to the extension of the sewer system, 15 right-of-way deeds with accompanying plats were prepared, 13 of which were acquired. During the year 43 contracts were prepared, all of which required specifications, plans, and estimated quantities. Many of these contracts required supplementary detailed drawings of junction chambers and other details. In connection with the future layout of the sewer system, 60 studies of drainage areas, run-off and corresponding sewer sizes have been made. Maps have been kept posted to date by the plotting thereon of 205 separate pieces of new sewer construction, 1,122 cases of new subdivisions, splits, alley and street openings or closings, new and revised street grades, and the location of 2,500 new houses constructed in the county. The system of record maps was extended by the addition of 11 new maps and in addition 10 old maps were replaced, as were 22 working maps which had worn out. Miscellaneous plats to the number of 139 were required, making a total of 975 drawings. In conjunction with the above, card indexes reflecting the various work done by this section were kept posted to date.

In connection with public service corporation underground construction, 3,320 permits were prepared during the year, and 5,394 inspections made of construction work. Sixty-one 50-foot scale maps were completed during the year for recording thereon underground construction. A total of 968 record sheets were made. Repairs were made to many record maps which were badly worn, and combination maps were provided in many cases to cover the older unmapped sections of the city. During the course of the year the records of vaults in public space were reviewed and where possible were plotted on record maps. This adds to the value of these maps and will make possible a more comprehensive study of proposed construction in the vicinity of existing vaults. Over 50 District of Columbia fire-alarm and police-patrol box installations were measured and plotted on record maps where such maps were available.

The amendments to the police regulations approved by the Commissioners of the District of Columbia March 4, 1924, permit the installation of fuel-oil tanks in public parking and in existing and proposed vaults in public space. This new regulation adds considerably to the work of this office. Preliminary field studies are necessary in order to ascertain if applicant has complied with existing regulations and if such installation is justifiable. It was necessary for this office to draft an agreement relating to fuel-oil tanks and filling pipes in public space, to be signed by owner or owners of property abutting proposed tank installations, before issuance of permit therefor.

A change in the method of handling permits, which was developed and put into effect in this office July 1, 1923, has resulted in materially improving permit service to the various public-service corporations and private companies. Applications for permits to connect premises with electric conduit, construct manholes, make sewer drains, minor repairs, etc., are now received, prepared, and recorded in this office, and sent directly to the permit clerk, where same are available at once. After permit has been issued the paper is returned and filed permanently in this office, instead of being returned to file in the record division, engineering division, as heretofore. While this procedure adds to the responsibility of this office, and burdens our files with additional records, it appears more businesslike than the former method, it effects a saving in time and stationery, and relieves the record division of caring for about 3,000 papers per annum. It was necessary, due to this change, to create a file for these new papers, and over 2,000 are now filed.

In all streets where new paving or resurfacing was proposed, a careful study was made of existing and needed underground construction, and where considered advisable recommendation was made to the Public Utilities Commission that the respective corporations be required to make such extensions. During the year over 30 plats were made showing needed extensions.

The work performed during the year requiring supervision by this section may be summarized as follows:

Gas mains laid	miles	16.75
Electric conduit laid	do	19.73
Telephone conduit laid	do	11.76
Traction conduit laid	do	1.56
Manholes constructed		1,739

Houses connected with gas	2,[illegible]
Houses connected with electricity	3,06[illegible]
Drains to sewerage system from manholes, fire hydrants, air valves, and watering troughs	151
Compressed air lines for inflating automobile tires at curb	11
Vaults constructed in public space	21
Steam mains and conduits laid across public space	5
Fuel oil tanks and filling pipes	12

Additional floor space is urgently needed for this section in order to permit of the efficient handling of public-service corporation work.

SURVEYS AND CONSTRUCTION

The work of this section covers all preliminary and detailed survey work required in connection with office studies and design, and the acquiring of all necessary field data for special reports. In addition all field work incidental to sewer construction performed under contract and by day labor is handled. All sewers built under contract are supervised and minor sewers with their appurtenances and storm-water catch basins are constructed by District forces.

Work performed during the year under 37 contracts involved the construction of 8.16 miles of sewers costing $469,284.24.

Work done by District forces under 420 jobs involved the construction of 7.92 miles of sewers, 218 manholes, and 133 storm-water catch basins. Also 36 manholes were adjusted and 52 special Y and T branches inserted. The cost of work performed by District forces amounted to $200,777.77.

Sewer construction was distributed throughout the District as indicated below.

Section	Linear feet	Cost
1. Within old city limits	11,543.92	$133,408.95
2. County west of Rock Creek	32,385.30	214,142.71
3. County east of Rock Creek	21,062.51	224,082.06
4. County west of Anacostia River	14,512.52	75,846.62
5. County east of Anacostia River	5,434.00	22,581.67
	84,938.25	670,062.01

Of the above sewers, 56,519.83 linear feet were service sewers constructed at a cost of $233,376.58. This class of sewers provided service for 954 houses, which averaged a length of 59.24 linear feet of sewer per house, at a unit cost of $244.63.

On the occasion of the funeral of the late President Harding (August 6–9) Pennsylvania Avenue was barricaded with wire cable from the Peace Monument to Seventeenth Street. The cost of this roping was $1,639.62, and to properly perform this work the services of over 50 men were required.

Incidental to the survey and construction work of this section, 171 assessment plats, showing construction of service sewers abutting assessable property, were forwarded to the assessor. Ten letters were forwarded to the health officer with notice of newly constructed service sewer abutting existing houses. Permits were granted for connecting 257 area drains to separate system sewers. These area drain connections were inspected and card record made of same. Two hundred and five record sheets, covering the work of the year, were made. Eighty-four measurement sheets were pre-

pared, covering payment, to contractors. Thirty and four-tenths miles of profile were run and plotted.

The fiscal year ended with work in progress on 10 contracts and with 13 contracts awarded on which no work had been performed.

During the year the only work done toward completing the system of interceptors of the sewage-disposal system was the construction of 2,858.30 linear feet of the upper Potomac interceptor, costing $20,000, and progress on section 10 of the Rock Creek main interceptor, calling for 1,525.18 linear feet, and estimated to cost $30,000.

As stated in last year's report, the activities of this section are seriously handicapped by the provisions of the organic act of the District, requiring that day-labor work be confined to those jobs estimated to cost $1,000 or less. At the date of the passage of the act (June 11, 1878), owing to the then low cost of material and labor, it was possible to construct about 800 linear feet of sewer for $1,000, while at the present time but 200 feet of sewer can be laid for this sum. To permit more elasticity in the functioning of this division, and coupled with the fact that construction appropriations for this division have increased from $20,000 in 1878 to $675,000 in 1924, recommendation has been made to have the above organic act amended so as to permit construction of sewers by day labor on work estimated to cost $5,000 or less.

Handicaps against which this section is struggling are the lack of an additional assistant engineer to head one of the field parties and inspectors to properly supervise contract work; also lack of motor transportation. Three field machines require replacement, and to facilitate construction work a tractor and a 3½-ton truck are urgently needed.

OPERATION AND MAINTENANCE

The work of this section covers collecting rainfall data, recording flow in sewers, annual inspection of trunk sewers, cleaning of trunk sewers, cleaning and flushing of pipe sewers, basin cleaning and flushing, inspection and maintenance of sewage regulators, sumps, and tide gates, cleaning storm-water outlets, gravel basins, and inverted siphons, and investigating complaints. In addition, this section is in charge of the supervision of the sewer division motor transportation, care of greenhouse and lawns, the manufacture of basin tops, the activities of the field blacksmith, carpenter, and paint shops, and the removal of waste from the sewerage system by water to point of disposal. It also has charge of the rolling stock and floating equipment, including the marine railway, and such stock of material as it is necessary to carry in this division.

Data for run-off studies were gathered from the records of 4 automatic and 26 pot gauges, as well as 167 cup gauges located in manholes to determine the flow in trunk sewers during excessive storms. During the year the number of pot gauges for rainfall data was increased from 23 to 26, and the number of cup gauges in sewers was increased from 104 to 167. Experiments are now being conducted with a new type of automatic rain gauge which it is believed will give desired information regarding the different stages

of storms, and should same measure up to expectations it is hoped to install 7 additional similar gauges during the coming year.

During the fiscal year 1924 the District was visited by but one storm that caused overcharging of the sewerage system. This storm occurred June 18, 1924. The total precipitation was 0.59 inch, and during the period of greatest rainfall 0.27 inch fell in 15 minutes, or at the rate of 1.08 inches per hour. As a result of this storm the streets in the low area were flooded to some extent for a short time. The northwest boundary sewer was generally overcharged and the northeast boundary sewer was overcharged west of Florida Avenue and Quincy Street.

The annual inspection of trunk sewers covered 83.1 miles. Some minor repairs were found to be needed, but the principal defect was the accumulation of silt. This condition is serious, as during heavy storms of the summer trunk sewers and interceptors generally are more or less overcharged. As the result of increased appropriation for maintenance allowed for the fiscal year 1924 some progress was made in removing the deposits of silt and débris from these trunk sewers. The force engaged on this work consisted of 12 laborers, and in that this force has proven inadequate it is proposed to increase the force to 19 during the fiscal year 1925. A total of 4,525 cubic yards of silt was removed from the trunk sewers under this activity.

During the year 175,985 linear feet of pipe sewers were cleaned, as well as 149 basin connections; 182 house connections were located and 91 old sewers examined. In connection with this activity, 6,659 cubic feet of silt was removed. With the force engaged in this activity, consisting of one foreman and four laborers, it was found impossible to keep abreast of the increased demand; consequently on April 8, 1924, this force was doubled. With a view of removing the deposits that collect in pipe sewers 4,606,449 linear feet of sewers and 12,480 manholes were flushed. The condition of the pipe sewers during the fiscal year 1924 compares unfavorably with that of previous years, and the number of obstructed sewers showed an increase due to varying causes. Probably the greatest contributing cause is the inability of the street-cleaning division to sweep the streets because of parked automobiles. The streets are consequently flushed and all the refuse washed into the catch basins, and thence into the sewers, the grade of which is not sufficient in most cases to carry such refuse, causing them to silt up rapidly. Other contributing causes are the inadequate force employed and the rapid growth of the city. Flushing of sewers should be undertaken every 30 days, as was the case 10 years ago, but now, with the force engaged on this work, it requires over four months to complete a route. The force is handicapped by the obsolete method of stretching a hose from a fire hydrant across the driveway to a sewer manhole on the opposite side of the street, necessitating protection of hose from traffic by heavy wooden bridges. This system is both dangerous to the men engaged on the work and to vehicular traffic passing over the bridge. Consideration is being given to motorizing this activity in employing large tank trucks.

Under basin cleaning during the fiscal year 1924, 3,845.5 cubic yards of silt was removed from 13,559 city catch basins, and in the

county districts 3,642 cubic yards of silt was removed from 2,785 basins. Prior to February 28, 1924, the city basins were cleaned by a force employing ten 1-horse tank wagons. After the above date four 1-ton Ford trucks with garbage bodies were placed in this service in lieu of the horse-drawn vehicles. These trucks were operated at a saving of $1.13 per cubic yard of silt removed, in spite of the fact that compensation of employees on this class of work was increased about 4 per cent by the new wage scale. The trucks also performed better service in that they increased the total work done by 16 per cent. A further saving directly caused by motorization, amounting to $2,266.80 per annum, was made in changing the method used on the dump, impossible with horse-drawn wagons. At the beginning of the year the force engaged in cleaning county basins employed two 2-horse dump wagons and drivers, later increased to three wagons. These horse-drawn vehicles were replaced on October 24 by a 3½-ton truck, reducing the cost per cubic yard of silt removed by $0.99 and accomplishing 54 per cent more work. Neither of these activities accomplish the results desired, and during the year 1925 it is proposed to augment the four city trucks by the addition of two similar trucks, and in the county it is proposed to employ an additional 3½-ton truck. Better service in this activity should result in less flooding of streets from stoppage of basins. In connection with this activity, 117 garage traps were cleaned at a cost of $2,050.16, this cost being paid for by the applicants. As the result of garage-trap cleaning and other miscellaneous duties required by the basin-cleaning force, such as cleaning ink chambers at the Bureau of Engraving and Printing, cleaning sump at the Woodridge pumping station, and the cleaning and flushing of drains of the Highway Bridge, a third 3½-ton truck is greatly needed.

The necessity for basin flushing is to replace stagnant water in catch basins with fresh water and thereby prevent the emanation of offensive odors. At the time of flushing a small amount of oil is poured into the basin to prevent the breeding of mosquitoes. This is a summer activity and generally is conducted from May 15 to September 1. During the fiscal year 1924 this service was active from July 1 to September 15, when 7,389 basins were flushed, but owing to the excessive rains of the spring and summer of 1924 there was no need for this service between May 15 and June 30.

To obtain efficient service from the sewerage system, it is necessary to maintain a rigid inspection of the 83 tide gates, 17 sewage regulators, 121 sumps, and 5 screens as incorporated in the system. This service has been carried on by two skilled laborers with a one-horse wagon and driver. With this service motorized, as will be the case in 1925, it is anticipated that double the service will be rendered by this force.

Complaints received during the fiscal year 1924 showed an increase of nearly one-third over the previous year. There were received in all 1,914 such complaints, classified as follows: 108 public sewers obstructed, 829 obstructed basins, 52 cases of bad odors emanating from public sewers, 28 cases of dead animals in catch basins, 104 broken basin tops, 1 broken alley grate, 34 basin tops requiring resetting, 87 broken manhole covers, 14 lost articles in public sewers, 8

obstructed garage traps, 1 accident, 355 obstructed house laterals, and 239 miscellaneous complaints. The work of this service is now handled by one inspector, but is increasing to such an extent that an assistant will soon be required.

This section cooperates with the street-cleaning department in disposing of snow. In this connection, the sewer division stations inspectors at sewer manholes to prevent congestion by snow being dumped into same. During the three snowstorms experienced during the past winter, 3,742.5 cubic yards of snow was cleared from the streets and disposed of through the sewers.

In connection with the maintenance of shops and yards, new motor vehicles were put into service as follows: Five 1-ton dump trucks, one 3½-ton dump truck, 2 Ford roadsters, and 1 Ford sedan, making a total of 28 motor vehicles now under the supervision of this section. In order to provide suitable housing for these machines, two sections of garage, each composed of three units 24 by 36 feet, were constructed These two sections are integral parts of a proposed garage that will be added to from time to time as requirements warrant. At present the District auto repair shop is primarily in charge of keeping motor vehicles in service; however, a small force is maintained at the pumping station for making minor repairs on these motor vehicles, as well as keeping the miscellaneous gasoline equipment in service.

Work in the various shops was carried on throughout the year. The carpenter shop constructed all forms necessary for sewer construction and made miscellaneous repairs to equipment The paint shop repainted the greater part of the sewer division rolling stock, as well as the two tug boats, and in addition performed the necessary painting around the station. The field blacksmith shop kept all rolling stock in repair and made 3,125 manhole irons in addition to miscellaneous work. A total of 286 basin tops, including dripstones and cheek blocks, were manufactured.

A much needed addition to the floating equipment was met with the construction of a small motor boat to be used for short hauls in the vicinity of the station. It is believed that this small tug can be used more economically for this class of work than the larger boat, which has been in service for a number of years.

The marine railway was in use from time to time throughout the year, and the revenue received from this source, together with rental for emergency pumps, amounted to $1,067.

The outstanding need in the operation and maintenance section is motor transportation. In order to efficiently function, there should be provided, in addition to those to be provided during the fiscal year 1925, six light and three heavy trucks.

PUMPING SERVICE

The duties of this section consist in the maintenance and operation of the steam-driven main sewerage pumping station and the three electric-driven substations. In conjunction with this work there is maintained a machine shop and a blacksmith shop, and in addition to the operating forces employs electricians, steam fitters, screen operators, etc., together with a clerical and computing force to properly record and study the performance of the various stations.

The total pumpage at the various stations during the year was as follows:

	Gallons
Main station	25,238,327,500
Poplar Point substation	739,918,571
Rock Creek substation	448,596,000
Woodridge substation	18,820,757
Total	26,445,662,828

Eliminating Rock Creek and Woodridge substations, which deliver their discharge to the main station, the above shows a mean total daily pumpage of 70,978,814 gallons. This is about 11 per cent greater than the water consumption of the District, attributable to infiltration of ground water and direct rainfall. The cost of pumping for the year was $0.0052 per thousand gallons.

The total coal consumption at the main station during the fiscal year was 4,013.36 tons, of which about 8 per cent should be charged off to cover bunker loss, use by the incinerator and other miscellaneous uses.

There were removed from the sediment chamber 2,848 cubic yards of silt; 538 tons of débris were removed from the screens, pressed, and incinerated; 14.5 tons of floating débris were removed from the skimming tank and incinerated; 406 tons of ashes were removed from the boiler ash pits; and 40 tons of ashes were removed from the incinerator. All silt and ashes were deposited on the flats of the upper Anacostia River. Silt to the amount of 220 cubic yards was removed from the sediment chamber at Poplar Point substation and buried on District property.

This section has studied, in conjunction with experts from the Bureau of Mines, various possibilities looking toward the betterment of the plant, and especially methods of adapting the boilers to a cheaper grade of coal than that at present in use. The more expensive grade of coal as now used is admirably suited to the installation of the station, and its purchase has been justified as the result of a saving of 85 cents per ton, due to barge delivery rather than truck delivery. During the past winter the Chesapeake & Potomac Canal was damaged by floods to such an extent that it was not opened for traffic in the spring, thus depriving the sewer division of the benefit of a reduced haulage rate. It is not impossible that the canal will remain closed permanently, in which case a cheaper grade of coal than Georges Creek is more or less imperative. As a result of the above studies the following betterments have been accomplished: The economizer was thoroughly overhauled and repaired. New damper regulator was installed. A steam-recording gauge was installed. An airproof coating was applied to the outer walls of the boilers. There is now a tentative plan for installing a new type of baffle in the boilers.

The coal consumption for the year was slightly lowered, probably as a result of the above improvements, although data are insufficient to determine what part, if any, of this saving was due to the above actions.

Assurance has been received from the Bureau of Mines that their experts will conduct an early test on the operation of the sewer division steam plant, looking to further betterments.

Other betterments made at the main station were the installation of a new ventilating fan, the installation of a new motor on the coal crusher, the installation of an auxiliary pump on the drainage system of the station, and the installation of new metal sash to replace wooden window frames in the boiler room. In addition material was purchased for the erection of a gallery to be located in the substructure under and parallel to the steam lines.

There were two periods of extreme high water experienced in the Potomac River during the year. On March 31, 1924, the flow reached 197,500 second-feet, with the water elevation opposite the station 3.6 feet above District datum. The second and highest water occurred on May 13, with the flow in the Potomac reaching 316,250 second-feet. On this latter occasion the elevation of the water opposite the main station reached 5.25 feet above District datum. The minimum flow of the year occurred on December 23, 1923, with 987 second-feet. The mean flow throughout the year was 18,558 second-feet. The maximum range of the tide in the Anacostia River as recorded by automatic gauge was 8.5 feet. This record eliminates consideration of the two flood periods.

CLERICAL

The work of this section includes the preparation of requisitions and vouchers, records of cost of day labor and contract construction, preparing pay rolls and pay roll analysis sheets, and material and equipment accounting.

Complete ledger control was maintained over all appropriations throughout the year and balances in the various appropriations were computed semimonthly and checked with the auditor. Financial statements were prepared monthly, and through a study of these statements the expenditures were kept within the limits allotted and an overobligation at the close of the year avoided. Daily record was kept of all issues of postage and street car transportation and detail monthly reports prepared.

Daily reports were prepared of construction work in progress on the sewerage system and the sewage-disposal system, the work of operation and maintenance of same, including sewerage pumping stations, shops and yards, and the supervision and inspection of work in progress by the various public-service corporations on underground construction.

Quarterly reports were submitted covering cost of operation, repairs, and mileage of motor vehicles. The number of vehicles assigned to this division increased from 18 in 1923 to 28 in 1924.

The annual inventory of the storeroom and store yard was taken and report of all expendable and nonexpendable material and equipment was forwarded to the auditor.

Sick leave granted the 57 statutory employees of the sewer division decreased from a total of 319½ days in 1923 to 232½ days in 1924, a reduction of 28 per cent.

In connection with the reclassification in the Government service, returns were submitted covering the 42 per diem employees of the sewer division.

A total of 71,133 reports and records were handled by this section during the fiscal year, while the total expenditures by the division totaled $993,966.56.

J. B. GORDON,
Sanitary Engineer.

The ASSISTANT ENGINEER COMMISSIONER.

REPORT OF MUNICIPAL GARAGE

WASHINGTON, D. C., *August 7, 1924.*

SIR: I have the honor to submit the following report on the municipal garage for the fiscal year ended June 30, 1924:

There were 40 automobiles maintained and kept in running order for the various departments of the District government by a labor and mechanical force of six men, whose duties were repairing automobiles, carrying mail from the city post office to the District Building, driving for the departments who were without automobiles or drivers allotted to their respective offices, gasing, oiling, washing cars at night, and also acting as watchmen.

The garage was kept open at all times, night and day, for urgent and necessary transportation.

Operating cost for the maintenance of the 40 automobiles, including gasoline, oil, tires, labor, and miscellaneous supplies, amounted to $17,895.61, or an average of $447.48 for each car, or $0.0574 per mile.

The cost of repair parts used in the cars was $2,460.41, or an average of $61.51 for each car, or $0.0151 per mile. Mileage of the 40 automobiles totaled 233,066 miles, or 5,826.6 miles per car.

The garage was constructed during the year 1917 for the housing of approximately 25 cars, sufficient floor space being allowed for the necessary repair work and cleaning of the cars. Additional cars purchased during the last seven years have increased the number at the garage to 44, which necessitates the storing of cars overnight in the aisles. Of this amount 9 automobiles are being stored at different places in the city, which is objectionable to the other departments housing these cars overnight.

It is recommended that action be taken for the relief of this congestion.

C. N. EMMONS,
Superintendent Municipal Garage.

To the SUPERINTENDENT, DISTRICT BUILDING.

REPORT OF BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS

WASHINGTON, D. C., *August 25, 1924.*

GENTLEMEN: We have the honor to submit the following report for the year ended June 30, 1924—buildings on which action was taken in response to notices served under the act creating the Board

for the Condemnation of Insanitary Buildings during the year ended June 30, 1924.

Number of buildings inspected	Examined	Condemned	Demolished	Repaired	No action warranted	Value of repairs	Pending
In streets	174	143	116	93	7	$35,380	29
In alleys	221	202	65	60	4	24,000	22
Total	396	345	181	153	11	59,380	51

BUILDINGS ACTED UPON SINCE THE CREATION OF THE BOARD TO JUNE 30 1924

In streets	4,308	.....	1,961	1,545	672	$253,420	.....
In alleys	5,068	.....	1,003	739	3,040	53,955	.....
Total	9,376	.....	2,964	2,384	3,712	309,375	.....

Number of board meetings held during the year ended June 30, 1924	25
Number of 20-day preliminary notices served	216
Number of condemnation notices served	213
Number of condemnation cards affixed to buildings	108
Number of inspections and miscellaneous visits made in connection with the service of notices, repairs being made to buildings, and the demolishing and removal of condemned buildings	1,490
Estimated number of people required to secure other living quarters through action of the board	905
Estimated number of occupants of dilapidated and insanitary buildings benefited by repairs to buildings through action of the board	1,071
Estimated value of repairs made to buildings through action of the board during the year ended June 30, 1924	$59,380
Estimated value of repairs required through the board from July 1, 1917, to June 30, 1924	$307,375

ALLEY LAW

There were two cases brought in the Supreme Court of the District of Columbia, Norment *v.* Rudolph et al., and Lockwood *v.* Rudolph et al., seeking to restrain the commissioners from enforcing the provisions of the alley law so far as concerns the property of the petitioners. An injunction was issued in each case, and the cases were appealed to the Court of Appeals. The Norment case was dismissed by consent of counsel, as the owners of the property had obtained an opportunity to sell advantageously. The Lockwood case, still pending in the Court of Appeals, No. 4084, is sufficient to test the questions raised as to the application of law.

The cases were tried below before Mr. Justice Bailey. The Lockwood case involved lots 45, 61, 26, reservation No. 10, improved by premises known as Nos. 218, 220, 224, 226, 228, 332, 334, 336, and 222 in Jackson Hall Alley, all of which are occupied as dwellings. Six of these houses front on an alley less than 30 feet wide and which does not run straight through the square. The alley is supplied with sewer, water main, and gas. Three of the houses front upon an alley that is less than 30 feet wide throughout its entire length and which does not run straight through the square but is supplied with sewer, water mains, and gas.

Judge Bailey ruled that there was nothing in the law which *required* a dwelling to be supplied with sewer and water and gas or

electric light, but that this provision applied only to the alleys, and the dwellings therefore were legal dwellings.

It is expected that this case will be argued before the Court of Appeals early in the October term.

Respectfully submitted.

R. A. WHEELER,
Major, Corps of Engineers, U. S. Army.
W. C. FOWLER,
Health Officer, District of Columbia.
JOHN W. OEHMANN,
Inspector of Buildings, District of Columbia.
A. S. J. ATKINSON,
Inspector for the Board of Condemnation of Insanitary Buildings.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF THE BOARD OF EXAMINERS OF STEAM ENGINEERS

WASHINGTON, D. C., *August 12, 1924.*

SIRS: The board of examiners of steam engineers have the honor to submit to you the report for the year ending June 30, 1924. The following table shows the work as it progressed during each month:

	Meetings held	Applications received	Applications approved	Applicants not competent	First class	Second class	Third class	Gas fired for pressing machines	Special class	Steam automobiles
1923										
July	4	18	15	3	1		8	1	5	
August	5	19	8	11			4	2	1	1
September	4	11	3	8			2		1	
October	4	15	5	10	1	1	2		1	
November	5	22	8	14	1		3	1	2	1
December	4	15	10	5	1	1	6		2	
1924										
January	4	16	8	8		4	4			
February	4	16	7	9	1	1	3		1	1
March	4	18	9	9			5	2	1	1
April	4	8	6	2	1		3	1		1
May	5	14	9	5	2		3	1	2	1
June	4	27	19	8	2	1	7	7	2	
Total	51	199	107	92	10	8	50	15	18	6

In connection with the submission of our report, we beg to call your attention to the insignificant remuneration allowed the members of the board of steam engineers ($150 per annum each). In view of the responsibility which this board is compelled to assume under the engineering act of 1887, we feel that more consideration should be shown by the bureau whose duties are to allot salaries for District employees, more particularly when our neighboring city of Baltimore allows $1,500 a year for experts performing the same duty as we, and $1,000 a year for a secretary. Our salaries should not be governed by the revenues derived from the issuance of steam engi-

neers' licenses, but should be based upon the protection of life and property afforded by proper examination of those who appear for license.

We believe, therefore, that with a spirit of equity and in face of the responsibility, the members of the board of steam engineers should be granted a compensation of not less than $500 each per annum.

Very respectfully,

E. F. VERMILLION,
H. BOESCH,
W. I. EVANS,
Board of Steam Engineers.

TO the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF THE WHARF COMMITTEE

WASHINGTON, *August 18, 1924.*

SIR: The wharf committee has the honor to submit the following report for the fiscal year ended June 30, 1924.

A statement giving the names of the tenants of water frontage under the control of the commissioners is on file in this office.

The leases of the Maryland, Delaware & Virginia Railway Co. and of Johnson & Wimsatt expired during the year. New Leases were entered into with the Baltimore & Virginia Steamboat Co., successors to the Maryland, Delaware & Virginia Railway Co., and with Johnson & Wimsatt. A lease was also entered into with the Powell Transportation Co. for a part of the wharf property formerly occupied by L. A. Clark & Son. This tenant has erected two very substantial and attractive concrete and steel warehouses on the site. Under the terms of the lease the commissioners reserve the right to order the removal of the buildings upon the expiration of the lease. Sixty-five per cent of the sugar transported to Washington is handled over this wharf. Potatoes, soap powder from Providence, R. I., and other commodities are shipped to this wharf. Heavy shipments of canned goods are expected this fall from lower river points.

The total revenue from wharf rentals amounted to $33,190.70.

The total frontage of wharf property along Water Street is 9,275 linear feet, of which slightly over one-half is under Federal jurisdiction. The frontage between the south curb line of N Street south and Thirteenth Street west is under the control of the Commissioners of the District of Columbia and is used and occupied by the municipal fish market and wharves, the morgue, the harbor precinct, headquarters of the fire-boat company, the workhouse and sand wharves, all of which are municipal activities; and also by lumber and cordwood merchants, warehouse men, boathouses, and various steamboat companies operating passenger and freight steamers.

The water front along the Georgetown Channel is under private control, with the exception of the termini of streets. The space at

the foot of Thirty-first Street NW. between building lines is leased by the Cranford Co.

Along the Anacostia River the United States Navy Yard occupies the frontage on the city side between Second and Eleventh Streets SE. The sewage pumping station and yard occupies the frontage between First and Second Streets SE. The intake of the Capitol power plant is located at the foot of First Street SE. The only frontage along the Anacostia River under lease is that between the building lines of Q Street SE., where the Standard Oil Co. has a pipe line.

The elimination of unsightly sheds and buildings along the water front as leases expired was continued.

The new head house at the concrete wharf, known as Wharf 6, was completed and will be occupied by the harbor precinct in the fall.

On January 26, 1924, a disastrous fire occurred at the dock of the Norfolk & Washington Steamboat Co. The head house and the warehouses on the wharf were completely destroyed. Only a part of the wharf structure, however, was burned. At the time of the fire the weather was severely cold and because of the high winds the firemen experienced much difficulty in confining the fire to the Norfolk & Washington Dock. The steamer *Midland* was greatly damaged, most of her superstructure having been destroyed. Fortunately, sufficient insurance was obtained to rebuild the dock. Steel sheds have been erected in place of the wooden structures, a one-story head house of semifireproof material has been erected, and the decking of the wharf is now being surfaced with 2 inches of asphalt on metal lath. It is hoped that with these precautions there will be no repetition of the disastrous fires which have occurred at this wharf. During the period of reconstruction the Norfolk steamers have been using the lighthouse wharf. The offices of the company are temporarily quartered in the head house at Wharf 6.

During the past spring the Potomac River was at flood stage. On May 13, 1924, the high-water mark at Chain Bridge was 36 feet. Much damage was done to private properties along the river at Georgetown and at the agricultural experimental station on the Virginia shore. The high water, however, did not materially affect any of the structures along the Washington Channel.

The wharf committee desires to renew its recommendation of last year in regard to the permanent development and improvement of the water front of the Washington Channel between Washington Barracks and Fourteenth Street SW. It is hoped that funds may be secured from Congress during the next fiscal year for the preparation of a plan for the improvement of this water front.

Respectfully submitted.

ROLAND M. BRENNAN,
Chairman.
D. E. MCCOMB,
H. R. LOHMAN,
Harbor Master.

To the ENGINEER COMMISSIONER.

REPORT OF SUPERINTENDENT OF THE DISTRICT BUILDING

WASHINGTON, *August 22, 1924.*

GENTLEMEN: I submit the following report on the care of the District Building for the fiscal year ended June 30, 1924:

POWER PLANT

The operation and maintenance of the power plant embraced the following:

Coal consumption totaled 2,014 tons, which averaged 10.87 per cent ash. Ashes totaling 577 cubic yards were removed at a cost of $288.50. Total number of kilowatt hours generated was 527,824; of this there was used for lighting 383,633; for elevators, 45,110, and for motors, 99,181. The pneumatic-tube system was in operation 2,152 hours, the heating system 4,854 hours, the ventilating system 1,078 hours, and the cooling system 2,278 hours.

Repairs were made to No. 3 engine at a cost of $989; new brass liners, rods, and valves were purchased for two vacuum pumps at a cost of $85; one complete set of tubes was replaced in one 150-horsepower boiler at a cost of $1,280; and one complete set of grate bars purchased for stoker at a cost of $349.07. Three new air pumps were purchased at a cost of $345.

It has always been difficult to heat the corner rooms of the District Building with our system of heating, which is indirect; to overcome this we removed two radiators from the corridor and placed them in the northeast corner room, second floor, which has proved very satisfactory. Due to an extension of quarters for use of the telephone exchange, fifth floor, it was necessary to supply additional heat; this also was taken care of by placing a radiator in these quarters, which are now equipped with both the direct and indirect systems of heating.

A lavatory was transferred from the suite occupied by the engineer commissioner to the corridor, fifth floor, east side, at a cost of $263.63. Minor repairs were made to plumbing throughout the building.

It will probably be necessary within the present fiscal year to retube three 150-horsepower boilers at an approximate cost of $4,000, and to replace the present air compressor which supplies air for the pneumatic-tube system.

WOODWORK AND PAINT SHOP

In addition to minor repairs throughout the District Building, including repairs to locks, doors, windows, etc., this department repainted walls and ceilings in 33 rooms at a cost of $2,277.71; floors were refinished in 5 rooms at a cost of $308.52. New partitions were built in the east and west corridors of the fifth floor. The telephone switchboard room was enlarged to provide more light and air for the operators. The counter in the tax collector's office was moved back 4 feet, and a new counter built at the north end of the room.

ELECTRICAL

Routine work including the care of elevators, guides, inclosures, motors, lights, and various electrical equipment was handled by this department. For the betterment of lighting conditions numerous changes were made in the lighting system.

The amount of current used by various departments for purposes other than lighting and which was charged to the maintenance of the District Building was:

	Kilowatt hours
Police department print shop	5,235
Health department	90,917
Fire-alarm headquarters	30,633
Electrical department shop	760

The elevator-signal system and the main tablet boards are badly in need of replacement; switches and fuse bases are burned and useless, probably due to the greatly increased load placed upon them.

BLUE PRINT AND PHOTOGRAPH SHOP

There were 93,519 square feet of blue printing completed at a cost of $2,795.13, and photographs totaling 1,101 completed at a cost of $661.64.

Attention is again called to the congested condition of most of the departments and request that steps be taken to find office space outside the building for one or two departments to relieve this condition.

JOHN E. WOOD,
Captain, Corps of Engineers, U. S. Army,
Superintendent.
E. P. BROOKE,
Assistant Superintendent.

The COMMISSIONERS OF THE
DISTRICT OF COLUMBIA.

O

DISTRICT OF COLUMBIA

THE OPERATIONS OF THE ENGINEER DEPARTMENT DISTRICT OF COLUMBIA

YEAR ENDED JUNE 30, 1925

DISTRICT OF COLUMBIA

THE OPERATIONS OF THE ENGINEER DEPARTMENT DISTRICT OF COLUMBIA

YEAR ENDED JUNE 30, 1925

REPORT

OF THE OPERATIONS OF THE

ENGINEER DEPARTMENT

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1925

UNDER THE DIRECTION OF

LIEUT. COL. J. F. BELL

Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1925

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ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT COLUMBIA

Lieut. Col. J. F. BELL, *Corps of Engineers, United States Army, Engineer Commissi*
Maj. R. A. WHEELER, *Corps of Engineers, United States Army, Assistant.*
Maj. W. H. HOLCOMBE, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONE

ZONING COMMISSION:
Maj. R. A. WHEELER, *Executive Officer.*
COLLECTION AND DISPOSAL OF CITY REFUSE; STREET AND ALLEY CLEANING:
MORRIS HACKER, *Supervisor.*
T. L. COSTIGAN, *Superintendent of Street Cleaning.*
SEWER CONSTRUCTION AND MAINTENANCE:
J. B. GORDON, *Sanitary Engineer.*
WATER DISTRIBUTION AND REVENUES:
J. S. GARLAND, *Superintendent.*
G. W. WALLACE, *Water Registrar.*
RECORD DIVISION:
ROLAND M. BRENNAN, *Chief Clerk.*
WHARF COMMITTEE:
ROLAND M. BRENNAN, *Chairman.*
D. E. MCCOMB, *Engineer of Bridges.*
H. R. LOHMAN, *Harbor Master.*
CONTRACT BOARD:
ROLAND M. BRENNAN, *Chairman.*
DISTRICT BUILDING:
Maj. W. H. HOLCOMBE, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR WHEELER

HIGHWAYS (STREETS, ROADS, BRIDGES, ETC.):
C. B. HUNT, *Engineer of Highways.*
J. W. DARE, *Assistant Engineer of Highways.*
Sidewalks and alleys—
H. N. MOSS, *Superintendent of Streets.*
Construction and maintenance of suburban roads—
L. R. GRABELL, *Superintendent of Suburban Roads.*
Construction and care of bridges—
D. E. MCCOMB, *Engineer of Bridges.*
Engineer Department stables—
BART J. LYNCH, *Superintendent.*
Asphalts and cements—
V. CLEAVER, *Inspector of Asphalt and Cement.*
TREES AND PARKINGS:
CLIFFORD LANHAM, *Superintendent of Trees and Parkings.*
SURVEYOR'S OFFICE (INCLUDING STREET EXTENSIONS):
M. C. HAZEN, *Surveyor.*
BUILDING INSPECTION:
J. W. OEHMANN, *Inspector of Buildings.*
Permits, Engineer Department—
H. M. WOODWARD, *Permit Clerk.*
Plumbing board—
LOUIS CONRADIS.
JAMES S. O'HAGAN.
SAMUEL TAPP.
Board of examiners of steam engineers—
E. F. VERMILLION.
H. BOESCH.
T. S. TINCHER.
BOARD FOR CONDEMNATION OF INSANITARY BUILDINGS:
Maj. R. A. WHEELER, *Assistant to the Engineer Commissioner.*
Dr. W. C. FOWLER, *Health Officer.*
J. W. OEHMANN, *Inspector of Buildings.*
PLUMBING INSPECTION:
A. R. MCGONEGAL, *Inspector of Plumbing.*

UNDER THE IMMEDIATE SUPERVISION OF MAJOR HOLCOMBE

ELECTRICAL DEPARTMENT:
WARREN B. HADLEY, *Electrical Engineer.*
CONSTRUCTION AND MAINTENANCE OF MUNICIPAL BUILDINGS:
ALBERT L. HARRIS, *Municipal Architect.*
HENRY STOREY, *Superintendent of Repairs.*
MUNICIPAL GARAGE:
E. P. BROOKE, *In Charge.*
CHARLES N. EMMONS, *Superintendent.*
PURCHASE OF LAND.
MOTOR TRANSPORT.
AUTOMOBILE BOARD.
PROPERTY MAINTENANCE AND UTILIZATION.

EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1925

OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, December 7, 1925.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats. 108), a report of the official doings of that governm nt for the fiscal year ended June 30, 1925.

* * * * * * *

ROADWAY PAVEMENTS

The accompanying table shows the area in square yards of new roadway pavements laid and old roadway pavements resurfaced during the year, with the total in square yards and miles of the various kinds of pavements at the close of the fiscal year.

Comparative statement showing character and extent of roadway pavements

	Existing amount on June 30, 1924		New pavements laid during year (square yards)	Pavements replaced during year (square yards)	Existing amount on June 30, 1925	
	Square yards	Miles			Square yards	Miles
Sheet asphalt and coal tar	3,443,476	183.36	66,882		3,510,358	186.88
Asphalt blocks	612,205	31.11		[1] 6,049	606,156	30.78
Asphaltic surface (Bessonite)	128,039	9.64	14,059		142,098	10.47
Durax blocks	17,968	.57			17,968	.57
Asphaltic or bituminous concrete:						
On concrete base	78,708	4.58			78,708	4.58
On stone base	38,909	2.16			38,909	2.16
Cement concrete	456,095	23.91	112,279		568,374	29.68
Granite block and rubble	317,962	17.47		[2] 14,059 [3] 17,328	286,575	15.64
Vitrified block	17,390	1.04			17,390	1.04
Cobble	36,374	1.52			36,374	1.52
Macadam (estimated)	1,687,098	108.20		[1] 26,655 [2] 46,137	1,614,306	104.74
Gravel and unimproved (traveled)		160.39				165.80
Gutters on asphalt streets	243,588		4,764		248,352	
Pavements maintained by street railways	616,807				616,807	
Gutters on asphaltic concrete streets	9,847				9,847	
Total	7,704,466	543.95	197,984	110,228	7,792,222	553.86

[1] Replaced with sheet asphalt. [2] Covered with asphaltic surface. [3] Replaced with cement concrete.

The sums appropriated for expenditures during the year under this head were as follows:

For repairing old roadway pavements, including asphalt resurfacing	$600,000
For paving new roadways	605,650
For repair of suburban roads	275,000
For grading streets, alleys, and roads	50,000
For paving and repaving roadways under the gasoline tax road and street fund	925,000

The prices paid under contracts for roadway pavements during the year were as follows:

	Per square yard
Laying sheet asphalt pavement (2½ inch asphalt surface, 2 inch binder before compression) with 6 inch concrete base:	
Class B—A reduced oil asphalt	$2.47 and $2.89
Laying vitrified block with 6 inch concrete base	2.90
Laying 6 inch concrete roadway	1.90

The outstanding feature of the year's construction program in this division was the work made possible by the tax on motor vehicle fuels amounting to over $900,000, distributed to 14 separate streets. This and some other increments added over $1,100,000 to the amount of our annual expenditures in excess of the preceding year's total. Due to the fact that the collection of the gasoline tax, month by month, limited the work payable therefrom that could be executed to the current balance of collections a certain retardation of this part of the year's work resulted, but despite this limitation all the work authorized by appropriation was completed or under contract and nearing completion at the end of the fiscal year.

The amount of resurfacing of asphalt pavements that could be done was about one-third of that necessary to prevent increase in the average age of the total yardage of this type—an average now far beyond that of any other municipality and evidenced by the deteriorated condition of the older streets especially in the early weeks of the working season. In recognition of this, more liberal funds have been provided for the coming year but there is a long arrearage of neglect to be made up. A moderate additional use of Bessonite was made on Seventh Street from Pennsylvania Avenue to G Street south. The examples of this form of surfacing laid in the past year or two exhibit satisfactory evidences of durability and further use will be made of the type.

A significant increase in the extent of repairs to cuts in pavements for underground installations occurred in the year's record of $435,000 for this work compared with about $370,000 for the preceding year. The individual items making up this total exceeded 60,000; every type of surface was involved in these repairs; the work was conducted, in effect, on a charge basis of 5 per cent addition to labor and material and the fund is self maintaining and thoroughly solvent.

At the end of the year all work of construction and maintenance of pavements that was provided for had been completed except a very few items intentionally retarded.

SUBURBAN ROADS

The appropriation for repairs to suburban roads and suburban streets was $275,000, and the appropriation for grading streets,

alleys, and roads was $50,000. Approaches were adjusted and surfaces relaid at the end of all newly paved streets, which work was charged to the various appropriations for paving. All cuts by plumbers and others in the suburban sections were repaired.

The very large amount of building being done in the suburban area and the consequent wear on street surfaces of all kinds has greatly increased the amount of work to be done by this organization. A great number of new unpaved streets opened and built upon during the year were added to the number to be maintained until they can be paved, requiring a corresponding increase in expenditures for work of a temporary character.

MUNICIPAL ASPHALT PLANT

During the year of 1925 the municipal asphalt plant was operated for a period of 242½ days, with a total output of 213,528 cubic feet of material, or an average daily output of 880½ cubic feet.

The details of the cost of the operation of the plant are contained in the report of the engineer of highways.

SIDEWALKS AND ALLEYS

The fund for paving alleys and sidewalks abutting private property amounted to $300,000, and for sidewalks abutting Government property $15,000. Cement concrete was used almost exclusively. The contract prices for sidewalks were lower than in the preceding year, being $2.08 per square yard for those adjacent to paved roadways and $2.21 per square yard for those adjacent to unpaved roadways; the latter being significantly in more remote localities.

BRIDGES

The expenditure for construction and repair of bridges amounted to $29,843.44 and the appropriations for the maintenance of the Anacostia and Highway Bridges were expended practically in full.

Portions of N Street trestle and bins were reconstructed.

Concrete culverts were constructed in line of Potomac Avenue and Manning Place.

Pennsylvania Avenue Bridge SE. was refloored.

ENGINEER STABLES

This activity rendered service at a substantial saving over the cost of hired teams. About 45 head of stock were maintained.

INSPECTION OF ASPHALT AND CEMENTS

Through this office, tests, chemical and physical, are made of materials used in street and road improvements, likewise all cements used in building and in sewer construction, fuel oils used at the municipal asphalt plant and miscellaneous tests of any materials requiring such. Tests made during the year were: Asphalt materials, 1,357; oils, 24; tars, 8; sand, 231; gravel, 121; stone, 235; limestone dust, 63; cements, 18,701, representing 187,643.75 barrels; and miscellaneous materials, 724. Total, 21,464.

Samples of asphalt tested represent 3,899½ tons, 3,139 tons used by contractors for laying roadways and 720½ tons used at municipal asphalt plant in producing paving materials.

Of the material tested there were rejected 1,515 cubic yards of concrete sand, 3,000 cubic yards of asphalt sand, and 2,800 cubic yards of gravel.

SURVEYOR'S OFFICE

The work of this office is divided, more or less, into three classes:

1. Work performed for private parties for which fees are charged as prescribed by order of the commissioners, and where not covered by schedule of fees, estimate is made covering the actual cost of the work to be performed.

2. Work done for the various departments of the Federal and District Governments for which no fees are charged.

3. Work done in connection with condemnation cases for the opening of streets and alleys, parks, school and playground sites, etc.

All classes of work in this office for the past fiscal year, ended June 30, 1925, showed a large increase over any previous year.

The total number of orders for work was 14,001 as compared to 11,707 for the previous year, making an average of about 45 orders for work per day.

The total receipts amounted to $55,809.95 as compared to $43,925.50 for the previous year, the amount collected for the past fiscal year being the largest amount ever collected for private work by the surveyor's office. Allowing for official work performed, this more than makes the office self-sustaining.

SURVEY TO MARK PERMANENT SYSTEM OF HIGHWAYS

The appropriation of $2,000 to be used for marking the permanent system of highways on the ground by permanent monuments has been used to splendid advantage. In the creation of new subdivisions if it were not possible to mark block corners, a large cost would be added in case of subsequent survey of the lots in the subdivision.

REVISION OF THE HIGHWAY PLAN

The appropriation of $1,500 for revision of the highway plan has also been advantageously used. Several studies have been made, but not yet submitted for final action by the commissioners and the highway commission, while others have been completed and made a matter of record.

More money could be used very advantageously for this work, especially since the creation of the National Capital Park Commission.

The acquisition of park areas, in many cases, necessitates a change in the highway plan to fit new conditions arising by reason of the acquisition of these park areas. No park should be acquired without a study of the highway plan, and both should be made to harmonize. This office feels, however, that the proper location of highways for the orderly development of private property, and the proper provisions for future traffic, is of great importance and should not be sacrificed.

CONDEMNATIONS

This office has charge of the work of preparing descriptions and plats for all condemnation cases to be prosecuted in court. This necessitates a vast amount of work by this office, such as accurate surveys of the property to be condemned, computations and plats based on actual surveys, and the furnishing of expert information to the jurors by the engineers of this office.

The total amount awarded as damages by the juries in the cases which were confirmed was $369,296.93 for the miscellaneous cases and $8,532.10 for the alley cases.

STREET EXTENSIONS

The record books show 59 cases for streets recorded, which were acquired by dedication or condemnation. A list in detail has been prepared showing the streets acquired, with their exact location, and submitted with the annual report.

PARKS

During the past year several small park areas were acquired, located as follows:

Parcel 144/23, at Sixteenth and Girard Streets, and Brentwood Road NE. Parcels 144/37 and 144/39, at Brentwood Road, Franklin and Fifteenth Streets NE. Square 3707, at New Hampshire Avenue, North Capitol and Longfellow Streets NE. Square 5606, at Good Hope Road and Minnesota Avenue SE. Square west of 1556, at Massachusetts Avenue, Forty-seventh and Upton Streets NW.

In this connection this office desires to call attention to a generous dedication of land for park purposes made by Mrs. Anne Archbold. This tract lies along the west side of Arizona Avenue, extending from the Glover Parkway to Reservoir Road, and will comprise a valuable addition to the park donated by Mr. Charles C. Glover known as the Glover Parkway. Mrs. Archbold is to be commended for the public-spirited and generous motives which prompted the donation of this tract to the District.

The park site selected to be acquired under the $5,000 appropriation for small parks was square 3638. Many small park sites were needed and should have been acquired, but the small appropriation of $5,000 would not permit of the acquisition of more property for this purpose. Property values having greatly increased during recent years, it is impossible to acquire but a very small amount of ground with such a small appropriation.

HIGHWAY PLAN

The permanent system of highways plan for that part of the District outside of what is known as the Federal city covered by the L'Enfant plan was adopted prior to 1900, and recorded in this office. All subsequent opening of streets and the subdivision of land were required to be made in conformity to the highway plan, except in some minor cases where the plan has been changed in accordance with the requirements of law in such cases where it was believed the topographical and changed conditions justified such changes.

Under the present law and regulations, streets in accordance with the highway plan can be acquired only when dedicated by the proprietors of the land or in cases where the commissioners deem that the streets should be opened in the public interests, in which case condemnation proceedings are instituted; but in all condemnation cases the law requires the entire cost of the land plus the court costs to be assessed as benefits.

There are a great number of proposed streets of vital importance to the proper development of the District in accordance with the highway plan. A comprehensive and orderly development of the highway plan can not nor will ever be perfected under either of the methods outlined above. These streets form an integral part of the general plan. The acquisition of the land within the lines of these streets must be completed in advance of all physical improvements, such as grading, sidewalks, sewer, water, etc., and it would seem that there are few more important matters to be given serious consideration by the commissioners than the opening of these streets. It would be a serious reflection upon the vision and foresight of the present authorities if these streets are not opened before they are blocked by costly improvements. Some important ones have already been blocked by reason of the delay in opening them.

There are very substantial reasons why these streets can not be acquired under existing law. In many cases small holdings would be wiped out or substantial improvements destroyed, creating a cost which could not in equity be assessed against the property benefited.

A tentative list of streets which should be opened has been prepared by this office, many of which will never be acquired under existing law on account of the impossibility of finding benefits equal to the damages and court costs. This list comprises over 40 streets and avenues, with approximately a total of 20,000,000 square feet of land, at an estimated cost of $7,000,000. The cost of condemnation of these streets, however, could be materially reduced by assessing some of the total cost back on the land benefited.

Some method should be devised to provide a very substantial fund to inaugurate a policy for the acquisition of all important streets. This might be done by direct appropriation or by authority to use a part of the surplus now in the Treasury to the credit of the District of Columbia.

CLOSING OLD ROADS

The authority given the commissioners by the last Congress under Public Act No. 349, approved January 30, 1925, to close streets, roads, or highways in the District rendered useless and unnecessary by reason of opening streets in accordance with the highway plan, has been applied in a number of cases to the betterment of the street plan, and has been found to be very beneficial in the resubdivision and development of land.

TREES AND PARKING

Two thousand two hundred and thirty young trees were planted in their permanent positions at the curb line along the streets of the District of Columbia during the fiscal year 1925. The increase of 21 miles in the mileage of street trees is the greatest yet accomplished.

A sum of $19,920 was expended for labor and material in connection with this work.

The usual variety of causes necessitated the removal of 1,998 trees from public space, 1,499 of which were paid from the appropriation for the trees and parking division at a total cost of $4,930.78, and the remainder from the appropriations of other departments and whole cost deposits.

Forty-eight thousand five hundred and nine trees, an increase of 38,899 over the previous year, were sprayed for the extermination of leaf-eating insects at a total cost of $2,164.65 for material and labor.

The nurseries at Fort Dupont and Poplar Point are well stocked with small trees of the varieties considered best for street planting. Approximately 75 acres adjacent to Fort Dupont have been loaned to this department, and it is believed that this will relieve the scarcity of nursery stock to a considerable extent. Nine hundred and fifty-three gingko, 855 willow-leaf oak, 346 elm, 403 Norway maple, 94 red oak, 153 lombardy poplar, and 90 acacia trees were transplanted to the nursery rows during the year.

No systematic trimming was undertaken during the year but attention was given to the numerous individual requests of residents and a sum of $5,939.88 expended in this work. The casualties reported by the police department were attended to at a total cost of $1,450.66; and the storm damage removed at a total cost of $340.38.

The cultivation of young trees along the streets was accomplished at a total cost of $1,479.16, while a sum of $3,575.67 was expended for the removal of weeds from the parkings.

While it is believed that the trees of Washington are in general good condition, insufficient appropriations have curtailed the activities of this department in its endeavor to give the existing trees proper attention and at the same time attempt to plant the new streets.

COLLECTION AND DISPOSAL OF CITY REFUSE

The amount expended for dust prevention and cleaning of streets and alleys and for the removal of snow was $443,667.39. The appropriation of $410,000 was increased by $35,000 during the session because of the emergency of handling a heavy snowfall in January. More than $44,000 was spent on this account.

The division has now six flushers, and it is proposed to buy two more before next winter. Flushing is the best method for cleaning the streets, say, nine months of the year. Last year 323,825,000 square yards were flushed, as compared with 89,246,000 square yards the year previous.

The amount of garbage collected was not so great by 2,162 tons as in the previous year. Notwithstanding 3,629,875 pounds of grease were produced, which netted receipts of $250,049.44. The expense of operating this reduction plant, together with the cost of shipping the raw garbage from Washington to Cherry Hill, was $180,126.60, so that garbage disposal was a source of profit to the extent of $69,922.84.

The past year the value of dump paper was exceptionally low, so that the receipts from the trash plant totaled but $92,361.18, whereas

the cost of disposal was $101,029.60. However, attention is invited to the fact that at the worst this is a very cheap means of disposal and that, furthermore, it is the most unobjectionable method of disposal.

The total receipts for this division from all sources were:

Garbage grease	$250,049.44
Salvaged trash	92,361.18
Hides	2,610.00
Manure	2,183.71
Total	347,204.33

The ashes from private householders were collected and disposed of at a cost of $133,484.49. Much of this material was used with benefit as a temporary surfacing to newly opened streets and alleys.

The division collected a total of 43,609 dead animals during the year. This was an increase of 8,764 over the previous year.

BUILDING OPERATIONS

The estimated value of building operations for 1925 was $62,862,980; for 1924, $39,403,207. The increase for the year just ceased was $23,459,773, an amount approximating double the yearly average of the pre-war period. This remarkable increase in building activities may be attributed only to the extraordinary growth, both actual and potential, of the District, as there have obtained no abnormal conditions in respect of buildings costs, materials or labor.

The number of permits issued was 11,993, or 547 more than in 1924. New buildings totaled 5,319, as against 3,012 in 1924, an increase of more than 70 per cent. Apartments numbered 120, while in 1924 there were 81, a difference of 39. Dwellings increased nearly 100 per cent, the respective numbers being 4,129 and 2,079. There were 1,070 business buildings erected in 1925 and 852 in 1924, a difference of 218.

Under the zoning law, certificates of occupancy were issued as follows: Conforming, no fee, 213; nonconforming, no fee, 133; both conforming and nonconforming, for which fees were charged, 2,663; total, 3,009. The fees received aggregated $5,500.

CONSTRUCTION OF MUNICIPAL BUILDINGS

During the year 9 buildings were under construction, as follows: Addition and alterations to Engine House No. 16; the Health School; John F. Cook School, 16-room building including combination assembly hall and gymnasium; Engine House No. 29; Truck House No 13.; alterations in the heating and electrical systems of the power plant for Armstrong Technical High School; addition to the laundry at the Tuberculosis Hospital; cottage for the National Training School for Girls, located at Muirkirk, Md.; District Training School, located near Laurel Md., construction of mess hall and dormitory.

Preliminary studies for the McKinley Technical High School have been made. This school will be placed on the market for bidding about January 1, 1926.

Besides the preparation of plans and specifications for the above-mentioned buildings, plans and specifications for about 50 other

pieces of work, such as heating systems in engine houses, police stations, and school buildings, and equipment for various buildings were prepared in this office, amounting to $176,318. The contracts entered into by this office for the fiscal year amounted to a total of $1,015,431.93.

REPAIRS TO MUNICIPAL BUILDINGS

All municipal buildings are kept in repair under the direction of the municipal architect.

The appropriations for repair work and the expenditures of same were as follows:

For the repairs to school buildings: $325,000 was appropriated, and all was expended.

For repairs to engine houses: $25,000 was appropriated, and all was expended.

For repairs to police stations: $7,000 was appropriated, and all was expended except $474.81.

For repairs to police court: $2,000 was appropriated and all was expended.

In addition to the above, repairs were made on various buildings under the supervision of the superintendent of repairs to the amount of $47,675.99 out of appropriations controlled by other departments.

Steam boilers in over 100 District buildings were inspected and repaired.

Modern lighting systems were installed complete or in part in 22 schools.

WORKHOUSE AND REFORMATORY

Good progress was made during the year in the construction work at the District Workhouse and Reformatory, consisting principally of constructing a building and installing machinery for a new brick-making unit at the brickyard, putting in service a section of the industrial railroad between the workhouse and reformatory and continuing work on the permanent buildings at the reformatory and workhouse. A considerable amount of repair work was performed at both institutions. At the close of the fiscal year three shops, one cell house, one disciplinary dormitory, and one boiler house had been completed at the reformatory; two shop buildings, one wash-house, and three dormitories were completed except for floors, installation of heating and plumbing, etc., and there were under construction three dormitories and one mess hall. At the workhouse the main structure of the first dormitory was completed and foundation laid in the second dormitory. A brick building was also constructed to house the new brick machinery.

DISTRICT BUILDING

The District Building, as originally planned, provided sufficient light and ventilation, also sufficient room, for the efficient execution of duties imposed upon the various departments of the District government. During recent years new departments have been created and many departments have increased their personnel, which has necessitated the building of partitions in offices and of rooms in corridors, thereby cutting off light and ventilation which are essential both from a health and from an efficiency point of view. Additional floor space should be acquired for the relief of this congestion.

There were numerous repairs made to the power plant. Consumption of coal totaled 2,168.6 tons, which averaged 17.3 per cent ash, an increase in consumption of 154 tons, due to the high percentage of ash. Ash totaling 867 cubic yards were removed at a cost of $428.50. Total number of kilowatt hours generated was 521,208. The pneumatic-tube system was in operation 2,153 hours, the heating system 5,092 hours, the ventilating system 826 hours, and the cooling system 2,636 hours. The woodwork and paint shop completed work totaling $6,435.32, which included building of partitions, doors, cashier cages, etc., also the painting of walls and ceilings, repairing of locks, door-stops, and doorchecks throughout the building. The electrical department has charge of the operation and repair of one freight and six passenger elevators, including operating boards, meters, inclosures, grids, etc., also installation of lights, fans, and electrical equipment. The entire system of intercommunicating telephones was renewed as well as the elevator brake shoes. There were many lights rearranged, due to office changes, and approximately 25 new lighting fixtures installed. The blue print and protograph shop completed 104,217 square feet of blue printing, at a cost of $2,480.43, and 485 photographs and maps, at a cost of $415.15.

MUNICIPAL GARAGE

Forty-four automobiles were maintained and kept in running condition during the fiscal year ended June 30, 1925. The garage was kept open day and night for urgent and necessary transportation. The machines were washed and supplied with gasoline and oil by the night force. A Duco paint shop has just been completed for the purpose of repainting automobiles for the entire District service.

The operating costs for the maintenance of these automobiles, including gasoline, oil, tubes, labor, and miscellaneous supplies, amounted to $18,692.38, or an average of $424.83 for each car—$0.0615 per mile.

The cost of repair parts used in the automobiles was $4,132.48, an average of $93.92 for each car, or $0.0205 per mile.

The total mileage made by these automobiles amounted to 235,535 miles, or an average of 5,353 miles per car.

Owing to the crowded condition of the garage, a second story should be added to the present building.

PLUMBING AND PLUMBING INSPECTION

The plumbing inspection division made 56,636 inspections during the year. About half of these were inspections of plumbing work in new buildings and about one-half were inspections on account of complaints of insanitary plumbing, leaky roofs, and defective rain leaders, which originated in other divisions of the District government.

During the year 34 warrants were obtained against unlicensed plumbers and others for violation of the plumbing regulations. These prosecutions netted a total in police court fines of $280. No case taken to court by the plumbing division was decided adversely.

The plumbing board held 24 meetings and examined 68 applicants, of whom 8 passed and were granted master-plumber licenses. At the close of the year there were 246 registered plumbers and 6 registered gasfitters.

PUBLIC CONVENIENCE STATIONS

There were in operation throughout the year four convenience stations, opened daily from 6 a. m. to midnight, and during the year the attendants reported a total patronage for all stations of over twelve and a half million. The cash receipts from use of pay compartments, etc., totaled $7,227.63, this being about one-third of the actual cost of the operation of the stations.

INSPECTION OF STEAM BOILERS

Four hundred and fifty-two steam boilers were inspected by the inspector of steam boilers during the year, including 42 boilers belonging to the District of Columbia. Five boilers were condemned as unfit for further use. The compensation of the inspector of steam boilers is paid from fees collected from the owners. The total amount of the fees reported by that official was $2,260 and the expense of inspection $375, leaving a net compensation of $1,885 for the inspector.

EXAMINATION OF STEAM ENGINEERS

The board of examiners of steam engineers held 51 meetings and examined 225 applicants, of whom 121 were found competent and 105 incompetent.

STREET LIGHTING

There are 22,567 public lamps of all kinds in the avenues, streets, alleys, etc., under the jurisdiction of the Commissioners of the District of Columbia. Of these, 11,861 are gas and 10,706 electric; of the gas lamps, 10,892 are single-burner mantle, 586 are double-burner mantle, and 383 are small flat flame, for designation purposes; of the electric, 822 are magnetite arc, 9,633 are incandescent, ranging from 60 to 600 candlepower each (93 per cent of 60 and 100), and 251 are incandescent, of about 10 candlepower, for "designation."

There was a net increase during the year of 744 lamps.

The increase in aggregate candlepower of the street-lighting system under the jurisdiction of the commissioners is from approximately 1,929,900 to approximately 2,183,400, about 13.1 per cent. Of this increase, about 6.4 per cent is due to actual increase of plant and about 6.8 per cent to improved operation of the arc lamps.

But 3 arc lamps were added, 1 of 6.6 amperes and 2 of 4 amperes; 25 incandescent lamps of 600 candlepower replaced electric lamps of lower candlepower in New York Avenue, Seventeenth to Twentieth Streets, and in E Street, Eighteenth to Twentieth Streets NW.; 25 of 400 candlepower were added, replacing smaller electric lamps in Thirteenth Street, G to I, NW., and about the Garfield Monument, and as a new installation on south approach to Francis Scott Key Bridge; 272 of 250 candlepower were added as new installations in Cathedral Avenue west of Wisconsin Avenue, in Piney Branch Road, and in Naylor Road, and replacing smaller lamps at

intersections in Fourteenth and Sixteenth Streets; of the smaller sizes, 307 were added, widely scattered, and 245 were discontinued. Of the gas lamps, 330 single burner were added, 258 single burner were changed to double burner, and 18 double burner added, all in the suburban territory.

The street lighting as a whole is distinctly inadequate. The installation in June of the 600-candlepower lamps in New York Avenue and E Street NW. was the initiation of the comprehensive plan heretofore reported; more extensive application of that plan is in process of installation.

The situation with respect to the several suits at law against certain railway companies for recovery of sums expended in maintaining lights adjacent to their respective rights of way remains essentially as stated in 1920 and succeeding reports, with accretion of sums claimed.

SIGNAL SYSTEMS—FIRE-ALARM TELEGRAPH, POLICE PATROL, SIGNAL, AND TELEPHONE SERVICE

There were 844 fire-alarm boxes in service at the end of the year, 718 on underground and 126 on overhead wires, a net increase of 38 over the preceding year; 2,908 box and local fire alarms (exclusive of "additional" alarms) were received and transmitted during the year, of which 227 were false alarms.

There were 501 police patrol boxes in service at the end of the year, 401 on underground and 100 on overhead wires, an increase of 1 compared with the preceding year; 12 were added, none discontinued, and 21 were changed as to station connection, by reason of the institution of twelfth precinct and incident change of boundaries of other precincts.

There were 1,664 telephones connected to the District system at the end of the year, and 29 in use as portable sets by fire and electrical departments, an increase of 39 in the year.

There were 2,692 cells of storage battery in service on fire alarms, police patrol, and local circuits at the end of the year.

There were in service in the composite-signals system (fire alarm, police, and telephone) on June 30, 1925, a grand total of 7,674 miles of conductor, of which 7,566 miles were underground and 108 miles overhead. Reserve capacity of cable is below requirement of demand and below safe emergency provision. Provision for expansion is again presented as an urgent requirement.

HARBOR FRONT

The actual frontage of the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water front is 18 miles, of which about 8 miles is set aside for parks and for other purposes of the United States. The greater part of the wharf property under the control of the commissioners is situated along the Washington Channel.

The harbor police station and dock, the dock of the fire boat, the District morgue, the municipal fish wharves and market and the District workhouse and sand wharves are located on the Washington Channel between N and Thirteenth Streets. The balance of the frontage is leased by steamboat companies, boathouses, lumber dealers, etc.

The Congress has authorized and directed the Secretary of War to make a preliminary examination and survey of the water front on the north side of the Washington Channel and to submit plans and estimates of the cost of constructing an adequate teminal or terminals to provide proper facilities for water transportation and for the interchange of traffic between vessels and railroads and highways, including any recommendations which may be deemed advisable for coordinating the full commercial use of the water front and approaches, with the beautification thereof. This survey is being made by the United States Engineer Office in charge of this district under the supervision of the Chief of Engineers of the United States Army.

Washington, with its growing population, may at some future time require that some of its commodities come by water and, with adequate terminal facilities, water-borne commerce should be encouraged. While it is extremely doubtful that the Government can get tenants that would be willing to pay a rental representative of a fair return on the cost of improving and developing the water front, any expenditure by the Government toward developing the water front of the National Capital in an attractive way can certainly be justified.

Some improvement in existing conditions has taken place.

SEWERAGE AND SEWAGE-DISPOSAL SYSTEM

The construction and maintenance of the sewerage system and the sewage-disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer.

The length of main and pipe sewers constructed during the year was 22.74 miles. The total length of main and pipe sewers on June 30, 1925, was 813.97 miles, of which 158.66 miles are main sewers and 655.31 miles are pipe sewers. In addition to the above new sewer work, 263 storm-water catch basins were constructed during the year, bringing the total number to 6,247.

There was expended during the year on new extensions of the sewerage system the sum of $770,787.82, and on the sewage-disposal system, $28,309. The total cost of the sewerage system to June 30, 1925, was $17,203,086.29, and of the sewage-disposal system to the same date was $6,053,531.96, making a total cost of the complete system of $23,256,618.25.

The main sewerage pumping station and the three substations were in continuous operation throughout the year, handling the sewage of practically the entire District. In addition the main station handled the storm water from the 900-acre low-level area flanking Pennsylvania Avenue from Peace Monument to Fifteenth Street. At the main station the combined pumpage of sewage and storm water amounted to 27,269,598,000 gallons during the year. The Poplar Point substation pumped 836,321,560 gallons, the Rock Creek substation 455,274,764 gallons, and Woodridge substation 19,881,700 gallons of sewage during the year. Eliminating Rock Creek and Woodridge substations, which deliver their discharges to the main station, the above would indicate a mean daily pumpage of 73,960,114 gallons. The coal consumption at the main station for the year was

3,477 tons, of which about 9 per cent should be charged off to cover bunker loss, used by incinerator and miscellaneous uses.

Application was made on April 18, 1925, for a connection with the sewerage system of the District by the Washington Suburban Sanitary Commission. This connection, the first under the agreement of June 3, 1924, was made on June 10, 1925, in Western Avenue south of Beach Street.

The need of some preliminary treatment of raw sewage before discharging into the Potomac is becoming increasingly more evident. The amount now being discharged from Washington alone in the raw state exceeds, during the late summer and fall months, that allowed by good practice.

During the year new sewers were constructed to provide service for 1,171 new houses. This was accomplished by the construction of but 68.2 linear feet of sewer per house, at a unit cost of $220.58. This small unit extension was permissible as the result of a general expansion of the built-up sections of the city. However, indications now point to a considerable number of extensive suburban developments which will of necessity require a greater unit expenditure. As the result of this anticipated direction of growth of the city, it is foreseen that larger appropriations will be required to meet the demands for service sewers. At the close of the fiscal year, service sewers were ordered to the amount of $127,885 in excess of the appropriation.

WATER MAINS

During the year 114,000 feet, or 21.4 miles of water mains were laid, an increase of 7.1 miles over length laid last year, making total length of mains now in service 709.4 miles, at an aggregate cost of $5,628,955.40 paid from water department funds.

WATER CONSUMPTION

The mean daily consumption for the year was 65,373,949 gallons, giving a mean daily per capita consumption of approximately 134 gallons.

The total pumpage for the year was 13,170,444,660 gallons.

The total coal burned was 8,954 tons.

The cost of operating for the year was $119,149.87, as against $123,878.31 in 1924, thus making the total operative cost of pumping 1,000,000 gallons of water into the mains $9.05, which is $0.96 per million gallons less than in 1924.

The financial statement of the water department revenues and expenditures will be found in the report of the auditor for the District of Columbia.

WATER METERS

During the year 2,961 new meters were installed, and 72,915, or 86.60 per cent, of the total water services are now metered, a drop of nearly 1 per cent from the year 1924, due to increased building construction.

Very respectfully,

CUNO H. RUDOLPH,
J. F. BELL,
F. A. FENNING,
Commissioners of the District of Columbia.

REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA

REPORT OF THE CITY REFUSE DIVISION

WASHINGTON, D. C., *July 30, 1925.*

SIR: I have the honor to submit the following report of the operations of the city refuse division, engineer department, for the year ended June 30, 1925:

The amount expended for dust prevention and cleaning of streets and alleys and for the removal of snow was $443,667.39. The appropriation of $410,000 was increased by $35,000 during the session because of the emergency of handling a heavy snowfall in January. More than $44,000 was spent on this account. It is not generally realized how difficult snow removal is, and that it is at best a very costly operation. Equipment is necessary that the division has not acquired because of the expense. Even with a large expenditure for equipment it would be idle much of the time and street cleaning would suffer. Such large expenditure has not been felt to be warranted for a city located in this latitude, which has infrequent falls of snow. Such equipment as is useful all the year round is being purchased.

The division has now six flushers, and it is proposed to buy two more before next winter. Flushing is the best method for cleaning the streets, say, nine months of the year. During the winter season, when flushing is not practicable on account of ice forming on the roadways by such process, snow plows are attached to these flushers and they stand in readiness to turn out when any snow falls.

Because of automobiles parked both day and night these flushers give better results than any other method of cleaning, so that here in Washington we depend on flushing more than any other method. Last year 323,825.000 square yards were flushed, as compared with 89,246,000 square yards the year previous. The tables appended hereto show the yardage cleaned by the several different methods and the cost of each.

The amount of garbage collected was not so great by 2,162 tons as in the previous year. Notwithstanding, 3,629,875 pounds of grease were produced, which netted receipts of $250,049.44. The expense of operating this reduction plant, together with the cost of shipping the raw garbage from Washington to Cherry Hill, Va., was $180,126.60, so that garbage disposal was a source of profit to the extent of $69,922.84.

As much can not be said of the trash plant. The past year the value of dump paper was exceptionally low, so that the receipts from this plant totaled but $92,361.18, whereas the cost of disposal was $101,029.60. However, attention is invited to the fact that at the worst this is a very cheap means of disposal, and that furthermore it is the most unobjectionable method of disposal and obviates the nuisance of burning this waste material on dumps, an offensive necessity in most other cities. The present plant is now being operated to its full capacity. An additional one should be built in another section of the city in the near future.

The total receipts for this division from all sources were:

Garbage grease	$250,049.44
Salvaged trash	92,361.18
Hides	2,610.00
Manure	2,183.71
Total	347,204.33

The ashes from private householders were collected and disposed of at a cost of $133,484.49. Much of this material was used with benefit as a temporary surfacing to newly opened streets and alleys.

The division collected a total of 43,609 dead animals during the year. This was an increase of 8,764 over the previous year.

An analysis of the cost of the several services performed by this office indicates very satisfactory unit costs. For the results attained my acknowledgments are due the employees of this division for their loyal and able efforts.

MORRIS HACKER,
Supervisor, City Refuse.

To the ENGINEER COMMISSIONER.

Cost of street cleaning July 1, 1924, to June 30, 1925

	Area (square yards)	Cost	
		Amount	Unit per M
Machine cleaning, horse	62,171,000	$20,767.74	$0.33
Machine cleaning, motor	49,077,000	11,247.17	.229
Alley cleaning	92,676,000	53,238.58	.57
Suburban cleaning	41,383,000	21,369.26	.516
Hand patrol	1,504,989,000	213,380.68	.142
Motor flushing	323,825,000	24,773.56	.077
Sprinkling		5,385.66	
Annual overhead		266.16	
Property accounting		2,309.64	
Dump men		3,195.58	
Waste-paper boxes		5,042.07	
Sunday cleaning		3,481.78	
Snow and ice		44,295.97	
Total		408,753.85	

Table showing comparative data in connection with street-cleaning work, 1921 to 1925

SQUARE YARDS CLEANED

	1921	1922	1923	1924	1925
Hand patrol	1,323,163,000	1,357,169,000	1,466,464,000	1,563,035,000	1,504,989,000
Machine, horse	119,256,000	66,194,000	65,451,000	64,673,000	62,171,000
Machine, motor		45,140,000	49,197,000	51,619,000	49,077,000
Alley cleaning	69,090,000	57,288,000	63,082,000	85,716,000	92,676,000
Suburban streets	60,382,000	50,221,000	39,234,000	38,259,000	41,383,000
Squeegeeing	127,598,000	94,650,000	59,940,000	46,387,000	
Motor flushing	40,842,000	48,223,000	72,628,000	89,246,000	323,825,000

DIRECT TOTAL COST

Hand patrol	$253,485.93	$208,573.06	$204,983.34	$205,551.42	$213,380.68
Machine, horse	48,237.93	20,337.33	19,534.74	21,312.26	20,767.74
Machine, motor		9,974.13	13,065.07	13,538.78	11,247.17
Alley cleaning	45,696.39	35,171.92	39,392.12	53,227.77	53,238.58
Suburban streets	33,372.65	19,887.76	18,024.78	20,776.27	21,369.26
Squeegeeing	27,684.70	14,286.34	11,845.35	7,772.53	
Motor flushing	7,424.81	6,498.78	8,795.66	9,726.74	24,773.56

COST PER 1,000 SQUARE YARDS

Hand patrol	$0.192	$0.154	$0.140	$0.131	$0.142
Machine, horse	.404	.307	.298	.330	.334
Machine, motor		.221	.266	.262	.229
Alley cleaning	.661	.614	.624	.622	.575
Suburban streets	.549	.395	.459	.542	.516
Squeegeeing	.217	.151	.198	.169	
Motor flushing	.182	.135	.121	.109	.077

Table showing comparative data in connection with disposal of all city waste from 1921 to 1925

NUMBER OF UNITS COLLECTED

		1921	1922	1923	1924	1925
Garbage	tons	60,058	69,452	80,014	75,089	72,927
Ashes	cubic yards	135,940	156,100	145,432	151,272	154,982
Miscellaneous refuse	do	148,908	196,763	190,021	186,907	197,890
Night soil	barrels	12,507	14,190	15,217	16,063	17,727
Dead animals	number	24,704	28,675	30,120	34,764	43,609

TOTAL NET COST

	1921	1922	1923	1924	1925
Garbage	$283,406.63	$210,268.15	$187,314.43	$235,235.01	$200,292.77
Ashes	116,421.04	135,267.18	117,727.67	131,589.11	133,484.49
Miscellaneous refuse	66,029.59	107,439.84	51,087.38	84,139.49	101,539.75
Night soil	17,500.00	17,500.00	17,500.00	24,000.00	24,000.00
Dead animals	3,360.00	3,360.00	3,360.00	4,911.81	4,668.84

MISCELLANEOUS DATA ON CONTRACTS

Class of waste	Contractor	Period of contract	Date of expiration	Price per annum	Collected from—
Night soil	Warner Stutler	3 years	June 30, 1926	$24,000	All privies in the District.

REPORT OF THE SUPERINTENDENT, WATER DEPARTMENT

WASHINGTON, D. C., *August 28, 1925.*

SIR: The annual report of the activities of the water department for the fiscal year ended June 30, 1925, is submitted herewith. Detailed reports of the various subdivision heads can be found on file in this office.

The total length of cast-iron water main of various sizes laid during the fiscal year is 114,000 feet, or 21.4 miles.

The total length of water main in the system of all sizes is 714 miles.

I wish to again call attention to the serious handicap which we have experienced in recent years due to the inadequate appropriation for the extension of service water mains, the original appropriation barely lasting for a period of nine months, thereby making it necessary to ask Congress for additional funds to carry on the work for the remainder of the year. This condition seriously upsets our schedule and in general delays our work. The following shows the amount appropriated for this work during each of the past four years, 1922 and 1923, $100,000 each; 1924 and 1925, $150,000 each; and each year it was necessary to obtain by appropriation an additional $50,000 to carry on the work, while the yearly mileage has increased from 11.1 miles in 1922 to 21.4 miles in 1925.

The mean daily water consumption for the year was 65,373,949 gallons, which showed a mean daily per capita consumption of approximately 134 gallons. The total pumpage for the year was 13,170,444,660 gallons as compared with 12,384,606,110 gallons last year.

Important work toward extensions consisted in laying of four trunk line mains, aggregating 20,833 linear feet, details of which will be found under report of engineering. No outstanding improvements were made to the mechanical equipment of the various pumping stations during the year.

During the fiscal year Brightwood Reservoir was cleaned twice and Reno Reservoir once.

Attention is called to the urgent need of more water storage space in our third high-service system, as under present conditions it is necessary to operate pumps almost continuously on this service. An appropriation to purchase a reservoir site adjacent to the existing basin is being asked for the coming year. Another basin would add materially to the safety of this service in case of a breakdown of pumps or during the necessary cleaning of these reservoirs.

The situation in Anacostia also is fast approaching the point where a radical change is necessary to provide a permanent and adequate water system for all of the territory east of the Anacostia River. To remedy this it will be necessary to eliminate a part of the gravity service now serving this section and extend the city first high service across Pennsylvania Avenue Bridge, abandon two of the three towers now in service and construct a reservoir at an elevation of 300 feet, or higher.

The following is a brief outline of the existing services now in operation in Anacostia:

Gravity service: Adequately supplied through 30-inch main across Pennsylvania Avenue Bridge and a 16-inch main through Benning Road, supplying ground elevation from 0 to 70 feet above datum.

Anacostia first high service: Two towers of 138,000 gallons each, making total storage of 276,000 gallons, whereas daily consumption during July, 1925, was 600,000 gallons. Supply is by two pumps of 1,728,000 gallons each, one of which is now being replaced by a unit of 3,000,000 gallons daily capacity, making a total daily pumping capacity of 4,728,000 gallons, which will be ample for years to come. The storage will have to be increased by providing a reservoir at an elevation as stated above. Ground elevation of the present service is from 70 to 170 feet.

Anacostia second high service: One tower of 138,000 gallons capacity, the consumption being negligible, will be ample for years to come. This tower supplies the highest points east of the Anacostia River, from 170 feet upward.

Detailed reports of the several subdivisions of the department are on file in the office of the superintendent, which, because of limited space, could not be included in this report.

J. S. GARLAND,
Superintendent, Water Department.

To the ENGINEER COMMISSIONER.

DISTRIBUTION BRANCH—ENGINEERING AND CONSTRUCTION

The most important work of the year was the laying of the following trunk water mains which were authorized by act of Congress: A 30-inch in Rhode Island Avenue NE. from a point about 400 feet east of the railroad viaduct to about 100 feet west of Seventeenth Street NE. This link, to provide adequate water service to Brookland and adjacent communities, was 4,578 feet in length. During the coming fiscal year this main will be extended to South Dakota Avenue. From South Dakota Avenue to Eastern Avenue smaller sized mains will be provided to take care of future needs.

A 16-inch trunk water main was installed in Cathedral Avenue from Wisconsin Avenue to Forty-fifth and Lowell Streets NW. The length of this main was 5,200 feet. By the laying of this main a rapidly developing section is now adequately provided with water where heretofore this whole territory has been supplied by a long line of 6-inch main. During the fiscal year 1926 an extension of 16-inch main has been authorized to begin at Forty-fifth and Lowell Streets NW. to complete a loop through Nebraska Avenue to Wisconsin Avenue NW.

A 16-inch trunk water main, 4,783 feet in length, was laid beginning at Fourth Street and Rhode Island Avenue NE., south in Fourth Street to T Street, west in T Street to Third Street, south in Third Street to R Street, west in R Street to Eckington Place, thence south in Eckington Place to Florida Avenue NE., connecting with the 30-inch main in Rhode Island Avenue NE. with a 12-inch main in Florida

Avenue. This main will reinforce smaller mains in a territory where recently there has been erected a number of large buildings and will provide sufficient water in case of fire.

A 16-inch trunk water main, 6,272 feet in length, has been laid in Minnesota Avenue SE. from Eighteenth Street to Good Hope Road, west in Good Hope Road to Nichols Avenue, south in Nichols Avenue to U Street, west in U Street to Shannon Place, thence south in Shannon Place to Howard Avenue. This main is not yet completed owing to the inability in obtaining permission from the Baltimore & Ohio Railroad Co. to lay the main in their right of way south from Howard Avenue. The portion already laid and in service, nevertheless, gives a greatly needed reinforcement to the gravity service in Anacostia, as well as providing Bolling Field with a full 8-inch instead of a 6-inch feed.

In advance of the paving of the roadway and the changing of car tracks in Wisconsin Avenue from River Road to Massachusetts Avenue NW., this department relocated the 12-inch, 16-inch, and 20-inch trunk water mains in Wisconsin Avenue between these two points. These changes were necessary in order to permit the street car tracks to be reconstructed in the center of the avenue.

On two occasions this department repaired broken section of 36-inch United States Government water main in First Street SE.

A total of 2,540 water meters were installed on house services during the year.

STEAM ENGINEERING

The following is a summary of the work done at the District pumping station for the year:

Water pumped, figured on plunger displacement:		
First high service	gallons	7,255,704,060
Second high service	do	4,032,957,070
Third high service	do	1,881,782,930
Total	do	13,170,444,660
Fourth high service	do	136,282,795
Coal burned	tons	8,954
Cylinder oil used	gallons	725
Engine oil used	do	1,388
Crank-case oil used	do	348
Filtered oil used	do	312
Turbine oil used	do	779
Grease use	pounds	633
Waste used	do	957

For the fourth high service the water is pumped from the Reno Reservoir, which is supplied by the third high service pumps, to an elevated tank by gasoline engines and triplex pumps. The water pumped for this service during the year was 136,282,795 gallons, or a mean of 372,680 gallons daily.

The Anacostia pumping station has been operated without interruption during the year, pumping to three towers supplying the area east of the Anacostia River. The water pumped for this service during the year was 212,849,516 gallons, or a mean of 583,149 gallons daily.

The total pumpage for the year at the District pumping station was 789,838,550 gallons more than in 1924. The greatest amount pumped in one day (June 3) was 45,690,960 gallons; least in one day (July 4) was 27,980,000 gallons, and the average dynamic head against pumps was 141.80 feet. The total operating expense (excluding overhead) chargeable to pumping was $119,149.87, as against $123,878.31 in 1924, making total operative cost (excluding overhead) of pumping 1,000,000 gallons of water into the mains $9.05, which is $0.96 per million gallons less than in 1924. The average cost of coal per ton for the year was $5.99, which was $1.30 less than in 1924.

The station duty for the year was 79,494,380 foot-pounds per 100 pounds of coal. This is 1.54 per cent less than the duty obtained during the preceding year, and represents an annual loss of approximately 140 gross tons of coal. This annual loss in coal may be attributed entirely to losses incurred in boiler efficiency, partly due to efforts to maintain normal steam pressure with fine (unsatisfactory) coal and partly to the necessity of charging boilers in service.

The activities of the various shops have continued as usual.

WATER SURVEYS

Activities of the water-survey division during the year were confined principally to the routine disposal of complaints and the cutting off of abandoned service pipes. No extensive special or routine water-survey work was undertaken during the year.

Four hundred and ten abandoned services were cut off at the main, taps removed, and plugs inserted as against 204 similar jobs last year. In the matter of securing removal of these service pipes by the owners of the premises supplied by them this office assisted in drafting of new regulations to be enforced by the plumbing inspector which will effect a great decrease in the cost of this work to the water department and will permit a much more rapid progress than obtained formerly. This office is now taking full advantage of existing provisions of the police regulations in the matter of repairs to leaking service pipes and fixtures and is requiring owners to do practically all of the excavating for the shut-offs instead of permitting them to await the expiration of the notice period and thereby secure the cut-off at the expense of the department.

The emergency leak force, engaged in repairing broken mains and miscellaneous other emergency work, formerly under the engineering division, was taken over by the water-survey division on July 21, 1924, and has continued upon this work without radical change from previous policy.

The care and operation of chlorinating equipment for the sterilization of water was assigned to this division during the latter part of the year.

Routine meter readings and inspections of all municipal buildings were continued throughout the year.

The water-survey shop was engaged in the repair and construction of all technical equipment used by the division, repairs to levels and transits, and the continuation of experiments with flow meter used for measuring and analyzing the water distribution.

STOREKEEPING

The cost of operating the storeroom for the year was 2.307 per cent of the value of material issued plus equipment disposed of.

A comparison of the percentage of cost for operating the storeroom for the past 10 years ranges from 4.64 per cent in 1916 to 2.307 per cent in 1925.

The value of material issued and equipment disposed of during the year was $623,756.73. Collected, stored, and delivered to contractors old materials to the value of $1,265.46. All tools and equipment which were worn out during the year were collected, inspected, and condemned by the survey officer and disposed of as ordered by the auditor of the District of Columbia.

The values of material and equipment received and issued during the year were as follows:

Material:	
Receipts	$631,535.42
Issues	607,168.47
Equipment:	
Receipts	35,009.44
Issues	16,588.26

The value of material on hand at close of year was $202,520.26; value of equipment in stock and in service at close of year was $700,050.22.

TRANSPORTATION

The transportation equipment at this time is composed of 47 automobile trucks, ranging in capacity from a light Ford truck to a 5½-ton truck. The total number of trucks has been increased by 2 during the year, and 5 old trucks were traded in as part payment on 5 new trucks.

The following transportation was furnished daily to the various subdivisions: Construction forces, 17 trucks, 8 chauffeurs; engineer division, 4 trucks, 3 chauffeurs; leak force, 2 trucks; valve division, 3 trucks; construction foreman, 1 truck; fire-hydrant division, 2 trucks; revenue division, 5 trucks; water-survey division, 6 trucks; street-hydrant division, 2 trucks; superintendent, 1 truck.

For use of the construction forces and for storage in property yards this division hauled during the year 34,377,700 pounds of material, or approximately 17,189 tons. From construction jobs we hauled to the dumps 1,557 loads of dirt, or about 6,228 cubic yards. Three hundred and seventy-six loads of ashes were hauled from the pumping station to jobs and the dump.

The charges for use of our trucks on general hauling, per 8-hour day, are as foollows: 5½-ton truck with driver, $16; 5-ton truck with driver, $16; 3½-ton truck with driver, $14; 3-ton truck with driver, $14; 2½-ton truck with driver, $12; 2-ton truck with driver, $12; 1-ton truck with driver, $9. While these rates are much lower than charged by contractors, the total revenue derived from use of our trucks during the year exceeds the cost of maintenance of same by approximately $4,000.

Particular attention is invited to the comparison of the percentage costs of operating the storeroom during the past 10 years and to the reasonable rates charged for our trucks.

ıLE I.—*Cost of work done by the water department for the year ended June 30, 1925*

ıds of expenditures	Per diem and salaries	Material expended, cuts, and transportation	Total expenditures	Charge to general account		Hauling and deposit accounts, Dr.
				Maintenance	Extensions	
ıurveys (detection of	$10,484.62	$465.69	$10,950.31	$10,950.31		
nance of meters	21,805.03	18,531.72	40,336.75	40,336.75		
tion of meters	11,120.25	17,582.98	28,703.23		$28,703.23	
f water registrar	85,584.36	18,961.70	104,546.06	104,546.06		
ion and repair of services	22,773.53	3,303.38	26,076.91	26,076.91		
g water mains	5,921.49	13,688.58	19,610.07		19,610.07	
vices installed	669.39	1,466.54	2,135.93		2,135.93	
ering (field survey)	35,408.48	2,397.82	37,806.30		37,806.30	
; account	21,084.68	6,810.88	27,895.56			$27,895.56
on and repair of s, fire hydrants, etc.	24,409.41	1,352.39	25,761.80	25,761.80		
tion of fire and pub-drants	3,062.79	19,399.11	22,461.90		22,461.90	
nains laid	176,552.03	335,163.76	511,715.79		511,715.79	
to leaks	30,926.94	9,813.78	40,740.72	40,740.72		
nance of reservoirs, s, and towers	4,481.48	885.98	5,367.46	5,367.46		
grounds	8,436.87	233.34	8,670.21	8,670.21		
ıent and deposit	17,726.01	23,482.02	41,208.03			41,208.03
ment work, lowering , etc.	5,080.55	2,910.94	7,991.49	7,991.49		
stimates, and tests	21,602.35	587.06	22,189.41	14,792.94	7,396.47	
Bryant Street pump-ation	24,654.88	4,048.65	28,703.53	28,703.53		
on and repair pumps, ıt Street station	48,786.36	65,423.79	114,210.15	114,210.15		
on and repair pumps, station	5,718.00	2,010.08	7,728.08	7,728.08		
on and repair pumps, stia station	7,179.98	2,763.58	9,943.56	9,943.56		
rk	33,509.66	39,443.37	72,953.03	72,953.03		
ed other District of ıbia offices	3,476.21	154.60	3,630.81	3,630.81		
ross expenditures	630,455.35	590,881.74	1,221,337.09	522,403.81	629,829.69	69,103.59

SUMMARY

ıtures:	
diem pay rolls	$476,897.62
ry pay rolls	153,557.73
otal services	630,455.35
erial expended, cuts, etc.	590,881.74
ross expenditures	1,221,337.09
ansportation and repayment	69,103.59
et expenditures	1,152,233.50

Charge to—		Per cent
Maintenance	$522,403.81	45
Extensions	629,829.69	55
Total	1,152,233.50	100

TABLE II.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work*

Diameter	In service June 30, 1924	Laid during year ended June 30, 1925	Abandoned during year ended June 30, 1925	In service June 30, 1925
3-inch ..... linear feet	87,704	1,292		[illegible]
4-inch ..... do	156,927	559		[illegible]
6-inch ..... do	1,470,183	1,214		[illegible]
8-inch ..... do	1,086,982	63,450		[illegible]
10-inch ..... do	9,114			[illegible]
12-inch ..... do	442,139	15,496		[illegible]
16-inch ..... do	34,389	18,382		[illegible]
20-inch ..... do	141,536	4,680		[illegible]
24-inch ..... do	56,141			[illegible]
30-inch ..... do	64,505	4,540		[illegible]
36-inch ..... do	59,457	4,387		[illegible]
42-inch ..... do	23			[illegible]
48-inch ..... do	44,172			[illegible]
75-inch ..... do	600			[illegible]
Total	3,653,872	114,000		[illegible]
Stop valves	11,797	295	84	[illegible]
Fire hydrants	4,042	142	3	[illegible]
Public hydrants	291	9	2	[illegible]
Sanitary fountains	23			[illegible]
Horse fountains	154	2		[illegible]
Public wells	44		1	[illegible]

TABLE III.—*Statement of the length and cost of water mains laid from July 1, 1878, to June 30, 1925, paid from water department funds*

Diameter	In service June 30, 1924	Laid during year ended June 30, 1925	Abandoned during year ended June 30, 1925	In service June 30, 1925
3-inch ..... linear feet	76,740	24		[illegible]
4-inch ..... do	116,503	48		[illegible]
6-inch ..... do	1,079,764	143		[illegible]
8-inch ..... do	1,026,017	61,055		[illegible]
10-inch ..... do	6,746			[illegible]
12-inch ..... do	381,628	14,248		[illegible]
16-inch ..... do	27,238	18,382		[illegible]
20-inch ..... do	130,434	4,680		[illegible]
24-inch ..... do	15,661			[illegible]
30-inch ..... do	26,938	4,540		[illegible]
36-inch ..... do	38,244			[illegible]
42-inch ..... do	23			[illegible]
48-inch ..... do	14,309			[illegible]
Total	2,940,245	103,120		[illegible]

Total cost to June 30, 1924	[illegible]
Total cost for the year ended June 30, 1925	[illegible]
Aggregate cost to June 30, 1925	[illegible]

REVENUE AND INSPECTION BRANCH

WATER RATES

The rate for domestic purposes is charged according to stories and front feet. On all tenements two stories high with a frontage of 16 feet or less, $6.25 per annum; for each additional front foot or fraction thereof greater than one-half, 39 cents; for each additional story or part thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume of business, and water facilities, from $1 to $25. If the flat rate on business establishments reaches $25 or more, the owner or occupant is required to install a water meter at his own expense.

A minimum rate of $5.65 is charged against all consumers supplied with water through meters, which allows the use of 7,500 cubic feet of water during the year, water used in excess thereof being charged at the rate of 5 cents per hundred cubic feet.

TABLE 1.—*Statement of collections*

Water rents:	
Flat rates	$94,196.64
Meters	921,612.06
Building purposes	7,795.28
Total	1,023,603.98
Water main tax, principal and interest	141,089.86
Miscellaneous receipts	935.42
Total receipts	1,165,629.26
Taps and stopcocks	21,862.28

TABLE 2.—*Statement of cash receipts of the water fund for the fiscal years from June 30, 1922, to June 30, 1925*

Year	Water rents	Water main tax, principal and interest on same	Miscellaneous receipts
1922	$943,182.45	$86,425.56	$2,455.49
1923	975,305.29	128,372.29	959.21
1924	1,035,858.89	109,843.31	619.72
1925	1,023,603.98	141,089.86	935.42
Total	3,977,950.61	465,731.02	4,969.84
1926 [1]	1,025,000.00	100,000.00	1,000.00
1927 [1]	1,030,000.00	100,000.00	1,000.00

[1] Estimate.

TABLE 3.—*General information*

Meters on services	In use June 30, 1924	Installed, 1925	Abandoned, 1925	Total in use June 30, 1925
District meters	66,073	2,603	204	68,472
District meters in municipal buildings	264			264
Private meters	3,643	356	23	3,976
Private meters, charitable institutions	201	2		203
Total	70,181	2,961	227	72,915

Average cost of reading meters	$0.204
Average cost computing and making bills	.258
Average payments for premises in which meters were installed (District meters only)	6.77
Average payments for flat rate accounts	8.44
Premises receiving allowance of free water:	
Number of institutions	168
Number of meters	203
Cubic feet of water consumed	35,449,200
Allowance of free water	36,081,340
Number of institutions exceeding allowance	31

Water services:	
In use June 30, 1924	80,285
Installed, 1925	4,146
Total	84,431
Abandoned, 1925	430
In use June 30, 1925	84,001
Metered	72,971
Not metered	11,030
Percentage of services metered	86.69

REPORT OF THE SANITARY ENGINEER

WASHINGTON, D. C., *September 1, 1925.*

SIR: The annual report of the sanitary engineer, covering the fiscal year ended June 30, 1925, is submitted herewith.

Under date of April 18, 1925, the first application was received from the Washington Suburban Sanitary Commission for a Maryland connection with the sewerage system of the District under the agreement reached on June 3, 1924. Actual connection was made June 10, 1925, in Western Avenue south of Beach Street.

Owing to the constantly increasing work of the division the need of more office space is becoming urgent. At the present time there are 21 employees of two sections with their desks, drawing tables, chairs, and lockers occupying one room measuring 41 by 28 feet. Other sections are becoming correspondingly crowded.

The practice of discharging raw sewage into the Potomac is becoming a greater menace to the health of the community each year and the need of some preliminary treatment of such sewage more evident. The population of the District, according to the latest available figures from the Census Bureau, is now 497,906, and the dilution figure based on the flow in cubic feet per minute of the Potomac per thousand of population fell below the danger mark of 300 on 18 days during the year.

The need of increased appropriations for service sewers can not be too strongly stressed. At the end of the present fiscal year there were sewers of this type ordered by the commissioners aggregating $127,885 in amount for which there were no funds available. In spite of the fact that appropriations have been more liberal during the last two fiscal years for this type of work the above figure is $12,000 greater than the corresponding figure of last year. If no further appropriations are made during the coming fiscal year for this class of work, the division will be more than $350,000 behind at the end of the year.

The following is a summary of the sewerage and sewage-disposal system as of June 30, 1925:

Length of sewerage system (miles):	
Main sewers	158.17
Pipe sewers	655.31
	813.48
Length of sewage-disposal system	38.01
Total length	851.49
Cost of sewerage system	$17,203,086.29
Cost of sewage-disposal system	6,053,531.96
Total cost	$23,256,618.25

The sanitary engineer wishes to take this opportunity to express his appreciation for the loyal and efficient service rendered by the employees of the sewer division. Their cooperation made the accomplishments of the year possible.

A brief résume of the year's activities follows:

OFFICE ENGINEERING

This section is charged with all computing, designing, and drafting necessary to the extension and operation of the sewerage system; with the preparation of necessary data and the writing of indorsements in connection with the handling of such jacketed files as are referred to it; with furnishing information to the public, particularly as to the availability and function of sewers in connection with the issuing of building permits. Also the preparation of permits for and supervision of all work done by the public service corporations, as well as that done by private parties in public space; involving a study of each application for a construction permit and the writing therein such locations as will avoid interference with existing or future construction and assure economical and orderly occupation of street space along predetermined and systematic lines. Final measurements are made and accurate records kept of all work performed. All surface division paving schedules are studied and recommendations for new installation made to the Public Utilities Commission in order to avoid the cutting of new street surfaces in an unreasonable time.

In connection with 75 contracts, drawings were made, specifications prepared, and bids scheduled. In addition and exclusive of miscellaneous plats, 44 other drawings covering a pumping station, an addition to the sewer division garage, junction chambers, tide gates, etc., were made. Twenty-five drainage studies collaborating run-off and capacities were made in connection with the extension, initial or future construction of the sewerage system.

Two hundred and sixty-nine surface division schedules containing 459 items were studied with the object of avoiding the cutting of new street paving by the installation of new or the replacing of defective sewers. Two hundred and forty-two separate studies comprising the reviewing of 135 and 107 surface division alley and street grade sheets, respectively, creating new or revising old grades were made and approved or not approved in accordance with their effect upon the present or future underground drainage schemes. Forty-three cases concerning the opening and closing of alleys were studied as affecting the sewerage system and either outright or conditionally approved. In addition to the standard drawings already enumerated, 75 miscellaneous plats to accompany special reports or indorsements were prepared. Seventy-six cases accompanied by blue print with pertinent information were forwarded to the assessor where a connection from an improvement or parcel property was made to the sewerage system. Fourteen rights-of-way deeds and accompanying plats were written and made, respectively, for the purpose of acquiring an easement for sewer construction in private property. Nine, 50 feet to the inch record maps and sixteen 100 feet to the inch working maps, which had become badly worn, were remade.

Maps of this division were kept posted to date by recording thereon of 250 cases of separate construction work and 633 subdivision and 350 splits. In the interest of eliminating privies, a map as of January 1 was prepared having plotted thereon all such structures, which totaled 3,164 for the District. Throughout the year 2,394 "plumbing slips" were issued in connection with application for building permits involving 4,624 individual improvements. Throughout the year data were prepared for indorsements written on 950 jacketed files as well as the necessary preparation of information incidental to the answering of 166 cases of nonjacketed correspondence. In the number of jacketed files quoted, 452 were applications for sewer construction, 405 of which eventually carried ordered work that required the preparation of 600 assessment slips to be forwarded to the assessor as information of pending assessment. In the interest of proper maintenance and of street space conservation, a study was made during the year having for its object the abandonment of duplicated sewers—cases where defective sewers had been replaced without their physical abandonment and left in partial service—which resulted, after necessary research work, in the official ordering of the complete abandonment of 34 separate lines of sewers. Card indexes reflecting new construction of both sewers and basins, subdivisions, completion reports, record sheets, area drains, Y branches, and subsoil drains were kept posted to date.

During the year 3,894 permits were prepared upon application and 7,925 inspections made of work under construction by the public service corporations.

Following is a summary of the work performed requiring supervision of this section:

Gas mains laid	miles	21.8
Electric conduits laid	do	27.6
Telephone conduit laid	do	12.8
Manholes constructed		2,[illegible]
Houses connected with gas		3,728
Houses connected with electricity		4,067
Drains to sewerage system from manholes, fire hydrants, air valves, watering troughs, etc		14[illegible]
Compressed air lines for inflating automobile tires at curb		4
Vaults constructed in public space		2[illegible]
Steam mains and conduits laid across public space		4
Fuel-oil tanks installed		1[illegible]
Fuel-oil fill pipes laid		5[illegible]

Due to the constant increase of this work and the present crampel quarters, more office space is urgently required.

SURVEYS AND CONSTRUCTION

The work of this section covers all preliminary and detailed survey work required in connection with office studies and design, and the acquiring of all necessary field data for special reports. In addition all field work incidental to sewer construction performed under contract and by day labor is handled. All sewers built under contract are supervised and minor sewers with their appurtenances and storm-water catch basins are constructed by District forces.

Work performed during the year under 73 contracts involved the construction of 12.87 miles of sewers costing $569,992.22.

Work performed by District forces under 450 jobs involved the construction of 10.24 miles of sewers, 289 manholes, 263 storm-water catch basins, 6 No. 1 alley basins, 1 concrete apron, 1 concrete culvert with wing walls, 1 junction chamber, and 4 test holes. Also 131 catch basins were reconstructed and 82 special Y and T branches inserted. The total cost of this work amounted to $239,094.60.

Sewer construction was distributed throughout the District as indicated below.

Section	Linear feet	Cost
1. Within the old city limits	8,463.72	$119,829.29
2. County west of Rock Creek	38,585.83	221,616.32
3. County east of Rock Creek	43,871.91	301,530.28
4. County west of Anacostia River	24,427.70	138,787.20
5. County east of Anacostia River	6,637.40	27,323.72
	121,986.56	809,086.82

Of the above sewers, 79,859 linear feet were service sewers constructed at a cost of $258,294.04. This class of sewers provided service for 1,171 houses, which averaged a length of 68.20 linear feet of sewer per house, at a unit cost of $220.58.

Incidental to the survey and construction work of this section 248 assessment plats showing the construction of service sewers abutting assessable property were forwarded to the assessor. Five letters were forwarded to the health officer with notice of newly constructed sewers abutting existing houses. Permits were granted for the construction of 436 area drains to separate system sewers. These areas were inspected and card index kept posted to date. Permits were granted for the construction of 75 depressed runways and 10 subservice drains, which were inspected and card indexed. Two hundred and seventy grade sheets for work constructed during the year and copies for future reference filed. Fifty-five and seventy-eight hundredths miles of profiles were run and plotted during the year.

The fiscal year ended with work in progress on 29 contracts and with 26 contracts awarded on which no work has been performed.

The work of this section has increased by approximately 40 per cent during the fiscal year, and additions to the personnel and office space are urgently required.

OPERATION AND MAINTENANCE

The work of this section covers the collection of rainfall data, recording flow in sewers, annual inspection of trunk sewers, cleaning of trunk sewers, cleaning and flushing of pipe sewers, basin cleaning and flushing, inspection and maintenance of sewage regulators, sumps and tide gates, cleaning storm-water outlets, gravel basins, and inverted siphons, and investigating complaints.

Data for run-off studies were gathered from the records of 4 automatic rain gauges and 26 pot rain gauges distributed over an area of 50 square miles as well as 130 cup gauges used in manholes to determine the flow during excessive storms in the main trunk sewers. During the month of June, 1925, 6 new Ferguson automatic rain gauges were installed, 5 of them replacing pot gauges. There were no storms during the year of sufficient intensity to overcharge the sewers.

The annual inspection of trunk sewers covered 61.59 miles of sewers at a cost of $928.56. A few minor repairs were found to be necessary. The accumulation of silt showed a marked decrease over the previous year due to the activity of a new force of men assigned to this work.

During the year 280,971 linear feet of pipe sewers and 131 basin connections were cleaned, 456 house connections located and 196 old sewers examined. In connection with this work there were 6,384 cubic feet of silt removed from pipe sewers, 3,966 catch basins flushed and treated with oil to prevent mosquito breeding, 4,848,890 linear feet of pipe sewers and 14,117 manholes flushed. The number of sewers obstructed shows a gradual increase—in 1923, 86; in 1924, 108; and in 1925, 121. This is due in great measure to the method of flushing the dirt off the streets into the sewers and to the length of time it takes to make a round of the sewers because of the increase in the size of the city and the increased traffic in the down-town sections.

In the basin cleaning activity there were cleaned in the city proper 30,872 basins from which was removed 8,964 cubic yards of silt at a cost of $17,693.98 and in the county 10,191 basins from which were removed 3,353 cubic yards of silt at a cost of $7,630.71. The increase in the force employed on this activity has resulted in a great abatement of the flooding of the streets during storms. The number of basins obstructed during the fiscal year 1924 being 839, whereas this year there were only 260. In connection with this activity 253.55 cubic yards of silt were removed from 119 garage traps, the cost being borne by the owners of the traps. There were 733.3 cubic yards removed from the ink chamber of the Bureau of Engraving and Printing, 134 cubic yards from the Woodridge substation, 74 cubic yards from the Rock Creek substation, 212 cubic yards from the Poplar Point substation and the cleaning and flushing of the drains of the Highway Bridge and Connecticut Avenue bridge once or twice a year.

In order to retain efficient service in the sewerage system it is necessary to maintain a rigid inspection of the 89 tide gates, 17 regulators, 128 sumps, and 7 screens in the system. During the year 7,656 inspections were made. The motorization of this activity has resulted in marked improvement in the work.

There were 1,427 complaints recorded during the fiscal year, 467 less than for the previous year. This improvement has been mainly due to the motorization of the basin-cleaning activity. These complaints were classified as follows: 121 public sewers obstructed, 260 basins obstructed, 60 cases of odors eminating from the public sewers, 26 dead animals removed, 150 basin tops broken, 82 basin tops reset, 17 lost articles, 6 broken alley grates, 50 obstructed garage traps, 261 obstructed house laterals, 112 broken manhole covers, 5 accidents, and 277 miscellaneous.

The section cooperates with the street-cleaning department in the disposal of snow. During the year such cooperation was rendered from January 2 to 17, and 25,466 cubic yards of snow were dumped in manholes under proper supervision.

During the year there were two explosions in the public sewers due to refuse oil being poured into the sewers, the first on May 18, 1925,

in the vicinity of Florida Avenue and Eighth Street NW., blowing 11 manhole covers and breaking 3. One laborer working in a plumber's trench in front of 2917 Sherman Avenue was slightly bruised and burned through the plumber's tap in the sewer.

PUMPING SERVICE

The duties of this section consist in the maintenance and operation of the steam-driven main sewerage pumping station and the three electric-driven substations. In conjunction with this work there is maintained a machine shop, a blacksmith shop, carpenter shop, paint shop, and cement shop, and in addition to the operating force employs electricians, steam fitters, screen operators, etc., together with a clerical and computing force to properly record and study the performance of the various stations.

The total pumpage at the various stations during the year was as follows:

	Gallons
Main station	27,269,598,000
Poplar Point substation	836,321,560
Rock Creek substation	455,274,764
Woodridge substation	19,881,700

Eliminating Rock Creek and Woodridge substations which deliver their discharge to the main station, the above shows a mean total daily pumpage of 73,960,114 gallons. This is about 9 per cent greater than the water consumption of the District, attributable to the infiltration of ground water into the sewers and the storm water entering them. The cost of pumping for the year was $0.0049 per thousand gallons.

The total coal consumption at the main station for the fiscal year was 3,723 tons, of which about 9 per cent should be charged off to bunker loss, use by the incinerator and other miscellaneous uses.

There were removed from the sediment chamber 2,322 cubic yards of silt; 672.5 tons of débris were removed from the screens, pressed and incinerated; 11.8 tons of floating débris removed from the skimming tank and incinerated; 348.6 tons of ashes were removed from the boiler ash pits and 51.3 tons of ashes from the incinerator. All silt and ashes were deposited on the flats of the Anacostia River. Silt to the amount of 212 cubic yards was removed from the sediment chamber at Poplar Point substation and buried on District property.

A new type of baffle was installed in one of the boilers during the year, and has proved so efficient as to warrant the expenditure of the necessary money to duplicate the installation in the remaining five boilers.

The Bureau of Mines will probably be able to conduct an expert test of the steam plant sometime during the coming fiscal year. Such a test will probably lead to again lowering the coal consumption and the unit cost of pumping as soon as its results are known.

Betterments made at the main station during the year include the installation of a gallery for the main steam lines, an electric pressure pump for the hydraulic system, the making and assembling of seven new metal frames for the east end of the boiler room, the *purchase and installation* of an intercommunication tele-

phone system to replace one held under lease from the telephone company, and the installation of recording ammeters on the generator lines.

There were no periods of extreme high water in the Potomac River during the year. The maximum flow, 95,500 second-feet, occurred on February 13, 1925; and the minimum flow, 1,250 second-feet, on December 18, 1924; the mean flow for the year being 9,223 second-feet. The maximum range of the tide in the Anacostia River as registered by an automatic gauge was 7.9 feet.

CLERICAL

The work of this section includes the preparation of requisitions and vouchers, records of cost of day labor and contract construction, preparing pay rolls and pay roll analysis sheets, and material and equipment accounting.

Complete ledger control was maintained over all appropriations throughout the year, and balances in the various appropriations were computed semimonthly and checked with the auditor. At no time during the year did the expenditures exceed the apportioned allotments made the 1st of July. Owing to increased activities during the year the general reserve of 5 per cent withheld from the various appropriations was released and expended. Financial statements were prepared monthly to permit a study of the available balances. The annual inventory of the stores was taken and report of all expendable and nonexpendable property forwarded to the auditor.

In connection with the classification of Government service 31 classification sheets of new positions, appointments, and transfers were prepared, which were forwarded to the Classification Board, and returned approved; 15 appeals for changes in classifications were made, 12 of which were approved. Graphic charts for efficiency ratings were made for the period from November 15, 1924, to May 15, 1925, and the reports of the ratings furnished the employees.

A total of 94,425 reports were handled by the section during the year. The total expenditures of the division amounted to $1,389,981.16.

TRANSPORTATION

This section is in charge of the upkeep and minor repair work of automotive transportation of the division.

During the year there were maintained 42 automobiles including 24 trucks, 17 passenger cars, and 1 tractor. The average cost for gasoline, oil, tires, repair parts, and labor for the trucks was $456.24 each, and for the passenger cars $332.99 each. The average mileage of the trucks was 6,594.8 each for the year, or 21.1 miles per working day; and for the passenger cars 8,552.4 each for the year, or 27.2 miles per working day.

More garage space is urgently needed, as it is necessary to keep eight trucks in the open at the present time.

J. B. Gordon,
Sanitary Engineer.

To the Engineer Commissioner.

REPORT OF THE WHARF COMMITTEE

WASHINGTON, D. C., *August 7, 1925.*

SIR: The wharf committee has the honor to submit the following report for the fiscal year ended June 30, 1925:

On March 3, 1925, the Congress authorized and directed the Secretary of War to make a preliminary examination and survey of the water front on the north side of the Washington Channel and to submit plans and estimates of the cost of constructing an adequate terminal or terminals which would provide appropriate facilities for water transportation and for interchange of traffic between vessels and the railroads and highways, including any recommendations which may be deemed advisable for coordinating the full commercial use of said water front and the approaches, with the beautification thereof.

One of the most noteworthy projects in the interest of the National Capital and one that transcends in importance many other local improvement items, is about to be initiated. Federal and District authorities, as well as civic associations, have for many years advocated the improvement and beautification of this water front.

The proposed survey will be made by the United States engineer officer in charge of this district, under the supervision of the Chief of Engineers of the United States Army. Upon completion of the survey and adoption of the approved plan, funds for beginning the work will have to be appropriated by Congress.

Nothing definite is known at this time of the details of the proposed plan. It is known that the present volume of commerce does not warrant the construction of railroad tracks in Water Street, and it is extremely doubtful if these tracks will ever be required. Washington, because of its geographical location, is not a transshipment port and it never will be. Practically all of the commodities shipped to Washington by water are for local consumption. There was a time when the water front gave evidences of feverish activity but that time, unfortunately, has passed. Before artificial ice was manufactured in the city of Washington, natural ice from the State of Maine was brought here throughout the year by boat, except when the river was frozen. Coal from the mountain districts of West Virginia came by way of the Chesapeake & Ohio Canal. Marine products from the Chesapeake Bay and the lower river, and fruits, vegetables, etc., from the tidewater counties adjacent thereto, were shipped to Washington by water. With the advent of the motor truck, the manuacture of ice, the growth of the railroads, and the nonuse of the Chesapeake & Ohio Canal, this commerce has practically stopped.

Washington, with its growing population, may at some future time require that some of its commodities come by water, and it is hoped that with adequate terminal facilities water-borne commerce will be encouraged.

One important element which should not be overlooked is the fact that the Government can not expect to get tenants at this time that would be willing to pay a rental representative of a fair return on the cost of improving and developing the water front. The city of New York has had a sad experience in this direction. Several years

ago that city, at considerable cost, constructed piers at Staten Island, only to have them remain untenanted.

The situation in Washington is probably different. Any expenditure for developing the water front of the National Capital in an attractive way can certainly be justified, even though tenants may not be found that could pay the rental the Government would expect to receive.

During the year the leases of Johnson & Wimsatt, the Amusement Security Corporation, the Norfolk & Washington Steamboat Co., the Washington-Colonial Beach Steamboat Co., and James O. Holmes expired. New leases were entered into in each case.

The total revenue from wharf rentals amounted to $32,216.48.

The unsightly shacks at Ragan's boathouse were torn down and a new metal building on a concrete foundation constructed. The Mount Vernon & Marshall Hall Steamboat Wharf, which was condemned by the commissioners a few years ago, has been completely rebuilt, and negotiations are now in progress to surface the wharf with asphalt. The wharf occupied by the Washington-Colonial Beach Steamboat Co. was repaired, and a new bulkhead in the slip used by the Norfolk & Washington Steamboat Co. for its auxiliary steamer was built. An attractive wire fence has been constructed by the Norfolk & Washington Steamboat Co. at its wharf.

Attention is called to the fact that it has been possible to make some improvements along the water front, although the District had no appropriation for that purpose. The improvements made were accomplished by having the tenants finance the cost of the work and by allowing them a partial credit on the rental.

The total frontage of wharf property along Water Street is 9,275 linear feet, of which slightly over one-half is under Federal jurisdiction. The frontage between the south curb line of N Street south and Thirteenth Street west is under the control of the Commissioners of the District of Columbia and is used and occupied by the municipal fish market and wharves, the morgue, the harbor precinct, headquarters of the fire-boat company, the workhouse and sand wharves, all of which are municipal activities; and also by lumber and cordwood merchants, warehousemen, boathouses, and various steamboat companies operating passenger and freight steamers.

The water front along the Georgetown Channel is under private control, with the exception of the termini of streets. The space at the foot of Thirty-first Street NW., between building lines, is leased by the Cranford Co.

Along the Anacostia River the United States Navy Yard occupies the frontage on the city side between Second and Eleventh Streets SE. The sewage pumping station and yard occupies the frontage between First and Second Streets SE. The intake of the Capitol power plant is located at the foot of First Street SE. The only frontage along the Anacostia River under lease is that between the building lines of Q Street SE., where the Standard Oil Co. has a pipe line.

The elimination of unsightly sheds and buildings along the water front as leases expired was continued.

A statement giving the names of the tenants of water frontage under the control of the commissioners is on file in this office.

The wharf committee desires to record its appreciation of the whole-hearted cooperation of water-front tenants in the endeavor to improve conditions along the water front. Some of the tenants, notably the Norfolk & Washington Steamboat Co., the Washington-Colonial Beach Steamboat Co., and the Mount Vernon & Marshall Hall Steamboat Co., have unselfishly expended private funds to improve public property.

Respectfully submitted.

ROLAND M. BRENNAN,
Chief Clerk, E. D., Chairman,
D. E. MCCOMB,
Engineer of Bridges,
Lieut. H. R. LOHMAN,
Harbor Master,
Wharf Committee, District of Columbia.

To the ENGINEER COMMISSIONER.

REPORT OF THE BOARD OF EXAMINERS OF STEAM ENGINEERS

WASHINGTON, D. C., *August 26, 1925.*

SIRS: The board of examiners of steam engineers have the honor to submit to you their report for the year ended June 30, 1925. The table following shows the work as it progressed during each month.

	Meetings held	Applicants received	Applicants approved	Applicants not competent	First class	Second class	Third class	Gas fired, for pressing machines	Special class	Internal combustion engines	Electric crane	Electric power
1924												
July	3	12	7	5			4	1	3			
August	5	7	1	6	1							
September	4	9	4	5			4					
October	5	12	4	8		1	2		1			
November	4	10	5	5	1	1	1	1	1			
December	4	8	6	2	1	1	2	1	1			
1925												
January	5	23	12	11	1	1	8		2			
February	4	10	2	8			2					
March	4	28	12	16			8	1	3			
April	4	24	12	12		1	5	1	5			
May	5	47	34	13	2	1	8	2	7	11	3	
June	4	36	22	14	1		4	1	13	2		1
Total	51	226	121	105	7	6	48	8	36	13	3	1

In conclusion, your board would respectfully call to your attention the fact that the work performed by the examining board has increased, not only in the number of applicants applying for license, but by virtue of the recent act of Congress amending the old steam engineer's law, which broadens the scope of the examinations to embrace steam engineering (three grades); electrical refrigerating; electric motors; special class; air compressors.

Each of the above classes require careful examination of the applicant to determine his fitness to operate the particular piece of apparatus in question, and requires the three examiners to have a thorough

knowledge of the above subjects. Therefore, we respectfully petition your honorable board to increase our remuneration to $500 per year each member. Our neighboring city of Baltimore allows $1,500 a year for experts performing the same duty as we, and $1,000 a year for a secretary. Our salaries should not be governed by the revenues derived from the issuance of steam engineers' licenses, but should be based upon the protection of life and property afforded by proper examination of those who appear for license.

Trusting this request will receive your favorable consideration, we are,

Very respectfully,

E. F. VERMILLION,
H. BOESCH,
T. S. TINCHER,
Members Examining Board Steam Engineers.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF THE BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS

WASHINGTON, D. C., *September 15, 1925.*

GENTLEMEN: We have the honor to submit the following report for the year ending June 30, 1925. Buildings on which action was taken in response to notices served under the act of Congress creating the board for the condemnation of insanitary buildings during the year ending June 30, 1925.

Number of buildings inspected	Examined	Condemned	Demolished	Repaired	No action warranted	Pending	Value repairs
In streets	539	255	125	334	65	20	$95,207
In alleys	323	75	60	173	75	10	3,450
Total	862	330	185	507	140	30	98,657
BUILDINGS ACTED UPON SINCE THE CREATION OF THE BOARD TO JUNE 30, 1925							
In streets	4,847	2,855	2,086	1,894	837	20	$346,627
In alleys	5,391	2,200	1,063	7,582	3,115	10	57,405
Total	10,238	5,055	3,149	9,476	3,952	30	404,032

Number of board meetings held during the year ending June 30, 1925	28
Number of 20-day preliminary notices served	240
Number of condemnation notices served	225
Number of condemnation cards affixed to buildings	85
Number of miscellaneous visits made in connection with the examination, service of various notices, repairs being made to buildings, the demolishing and removal of buildings condemned by the board	2,225
Estimated number of people required to secure other living quarters through action of the board	950
Estimated number of occupants of dilapidated and insanitary buildings benefited by repairs to buildings through action of the board during the year ending June 30, 1925	2,309
Estimated value of repairs made to dilapidated buildings through action of the board during the year ending June 30, 1925	$96,657
Estimated value of repairs to dilapidated buildings by the board since June 1, 1917, to June 30, 1925	$404,032

EVICTION OF ALLEY DWELLERS

Alley law:

That the operation of the second paragraph of section 1, relating to the use or occupation of alley buildings as dwellings, of the act of Congress approved September 25, 1914, entitled "An act to provide, in the interest of public health, comfort, morals, and safety, for the discontinuance of the use as dwellings of buildings situated in the alleys in the District of Columbia," be, and the same hereby is, postponed until June 1, 1923. Approved September 6, 1922.

Two cases were brought before the Supreme Court of the District of Columbia: Norment *v.* Rudolph, et al., seeking to restrain the commissioners from enforcing the provisions of the alley law, so far as concerns the property of the petitioners. An injunction was issued in each case, and the cases were appealed to the court of appeals. The Norment case was dismissed by consent of counsel, as the owner obtained an opportunity to sell advantageously. The Lockwood case, still pending in the court of appeals, No. 4084, is sufficient to test the questions raised as to the application of the law. The court of appeals without passing upon the law at all remanded it for further proceeding on the score that it was a criminal prosecution, and should have started in the police court.

The following cases were filed in the police court March 27, 1925:

Franklin P. Nash, et al	No. 822891
James E. White, et al	No. 822892
Charlotte E. Lockwood, et al	No. 822893
Spiros Konmaris, et al	No. 822894

Motions to quash and demurrers were filed March 27, 1925. All cases were consolidated and argued together as test cases. At the request of the court, briefs were filed by both sides. The police court now has the matter under advisement.

Respectfully submitted.

R. A. WHEELER,
Major, Corps of Engineers, U. S. Army.
W. C. FOWLER,
Health Officer.
JOHN W. OEHMANN,
Inspector of Buildings.
A. S. J. ATKINSON,
Inspector for the Board for the Condemnation of Insanitary Buildings.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF SUPERINTENDENT OF THE DISTRICT BUILDING

WASHINGTON, *August 27, 1925.*

SIR: I submit herewith, for the fiscal year ended June 30, 1925, my report on the care of the District Building, including the operation of the power plant, woodwork and paint shop, print, blue print, photograph, and electrical shops.

I wish to call your attention to the fact that many departments of the District government, having offices in the District Building, because of limited working space, are greatly hampered in the performance of their duties. The building, as originally planned,

provided sufficient light and ventilation, also sufficient room, for the efficient execution of duties imposed upon the various departments; during recent years new departments have been created, and many departments have increased their personnel, which has necessitated the building of partitions in offices and of rooms in the corridors, thereby cutting off light and ventilation which are essential both from a health and from an efficiency point of view. It is recommended that additional floor space be acquired, either by building an addition to the District Building or the acquisition of adjacent property in order to relieve this congestion.

POWER PLANT

With few exceptions the employees of the power plant have taken care of repairs in this department. The costs given are for material only, had the labor required for the following repairs been performed by contract, our appropriation would have been heavily drawn upon. There was rebuilt one stoker at a cost of $320, one smoke-consuming arch at a cost of $25, and one primary heater for our heating system at a cost of $8, the cost of new pipe being saved by recutting and replacing the old; two boiler settings were covered with "Sterling boiler seal" at a cost of $180, repairs were made to engines at a cost of $181. Two armatures were rewound, one for the sump pump and one for the ammonia compressor at a cost of $180. One new set of contact points for the voltage regulator was purchased at a cost of $26. Nos. 1, 2, and 3 fans, for driving heat from the sub-basement to the upper floors, were given a general overhauling, all three driving chains being rebushed and the old pins replaced with new ones. Minor repairs to the power plant included boiler feed pumps, the car tracks from coal vaults to boilers, replacing sections of pipe, etc. There was one change made to the pneumatic tube line, this being the transfer of a line from room No. 117 to room No. 102, for use of the director of traffic. Repairs to plumbing, such as replacement of diaphragms in flush valves, washers on faucets, and opening of sewers throughout the building, consumed practically the entire time of one man.

Consumption of coal totaled 2,168.6 tons which averaged 17.3 per cent ash, as compared with the past fiscal year, an increase of 154 tons in consumption and an increase of 6.43 in ash percentage. Ashes totaling 857 cubic yards were removed at a cost of $428.50. Total number of kilowatt-hours generated was 521,208; of this there was used for lighting 386,108, for elevators 50,540, and for motors 84,560. The pneumatic-tube system was in operation 2,153 hours, the heating sytem 5,092 hours, the ventilating system 862 hours, and the cooling system 2,636 hours.

WOODWORK AND PAINT SHOP

During the fiscal year just ended there were numerous changes made in the interest of efficiency and the economical performance of duties, which included alterations to room No. 120 and the removal thereto of the license bureau. Upon the creation of the department of the director of traffic, room 220, which was the woman's lunch room and

the only room available, was altered to suit the requirements of the office. This space proving inadequate, alterations were made to room No. 102 and part of room No. 104, and the department transferred to these quarters.

This department completed work totaling $6,435.42, which included repairs to locks, doors, and windows, repainting of walls and ceilings, building of partitions, doorways, and cashier cages, renewal of window glass, locks, doorstops, doorchecks, etc.

ELECTRICAL

This department has charge of the operation and repair of one freight and six passenger elevators, including operating boards, meters, inclosures, grids, plates, and contacts. The department also has charge of electric fans, lights, tablet boards, etc. The operating grids for the sidewalk freight elevator were renewed, the entire system of intercommunicating telephones was renewed at a cost of $294.70, and new elevator brake shoes were installed at a cost of $114; fans were installed in six passenger elevators, and the entire elevator signal system was repaired. There were many lights rearranged due to office changes and there were approximately 25 new lighting fixtures installed.

The amount of current used by various departments for purposes other than lighting and that was charged to the care of the District Building was:

	Kilowatt-hours
Police department print shop	6,047
Health department	60,718
Fire-alarm headquarters	28,642
Electrical department shop	680

BLUE PRINT AND PHOTOGRAPH SHOP

During the past two years the school building program has practically doubled the work of this shop. The demands of contractors for blue prints require capacity production. There were completed 104,217 square feet of blue printing at a cost of $2,480.43, and 485 photographs, photostats, and maps at a cost of $415.15, making a total of $2,895.58.

W. H. HOLCOMBE,
Major, Corps of Engineers, U. S. Army,
Superintendent.

E. P. BROOKE,
Assistant Superintendent.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

REPORT OF SUPERINTENDENT OF MUNICIPAL GARAGE

WASHINGTON, D. C., *September 3, 1925.*

SIR: I have the honor to submit the following report on the municipal garage for the fiscal year ended June 30, 1925:

There were 44 automobiles maintained and kept in running order for the various departments of the District government by our *mechanical and laboring* force, whose duties were repairing auto-

mobiles, carrying mail from the city post office to the District Building, driving for the departments who were without automobiles or drivers allotted to their respective offices, greasing, oiling, washing cars at night, and also acting at watchmen. In connection with this garage we have an automobile repair shop located at Second and Bryant Streets, where all automobile repair work is done for the water department, sewer department, the various activities connected with the Board of Charities, and others.

A Duco paint shop has just been completed, and we contemplate painting automobiles for the entire District service.

The garage was kept open at all times, night and day, for urgent and necessary transportation.

Operating cost for the maintenance of the 44 automobiles, including gasoline, oil, tires, labor, and miscellaneous supplies, amounted to $18,692.38, or an average of $424.83 for each car, or $0.0615 per mile.

The cost of repair parts used in the cars was $4,132.48, or an average of $93.92 for each car, or $0.0205 per mile. Mileage of the 44 automobiles totals 235,535 miles, or 5,353 miles per car.

Owing to the crowded condition of the garage it is recommended that a second story be added to the present building. The garage was constructed in the year 1917 to house 25 cars, with sufficient floor space being allowed for the necessary repair work and cleaning of cars. Additional cars purchased during the last eight years have increased the number to 44, which necessitates the storing of cars overnight in the aisles. Of this number 13 automobiles are being stored at different places in this city, which is objectionable to the other departments housing these cars overnight.

C. N. Emmons,
Superintendent Municipal Garage.

To the Superintendent District Building.

REPORT OF THE ASSISTANT ENGINEER COMMISSIONER

WASHINGTON, D. C., *October 2, 1925.*

SIR: I have the honor to submit the following reports of the departments and offices under my immediate supervision.

R. A. WHEELER,
Major, Corps of Engineers, U. S. Army,
Assistant Engineer Commissioner, D. C.

To the ENGINEER COMMISSIONER
DISTRICT OF COLUMBIA.

REPORT OF THE ENGINEER OF HIGHWAYS

WASHINGTON, D. C., *August 20, 1925.*

SIR: I have the honor to submit the following report of the operations of the engineer of highways for the fiscal year ended June 30, 1925. The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the highway division aggregated $3,301,121.90, of which $300,000 was for paving sidewalks and alleys in all parts of the District; $605,650 for paving new roadways; $600,000 for repairing old roadway pavements, including asphalt resurfacing; $275,000 for repair of suburban roads; $30,000 for construction and repair of bridges and viaducts; $50,000 for grading streets and avenues; $15,000 for sidewalks and curbs around Government reservations, buildings, and parks; $45,000 for paving roadways under the permit system; $20,000 for completion of trestle and bins in N street NE. between First and Second Streets; $925,000 for paving and repaving roadways under the gasoline tax, road, and street fund; while $435,471.90 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

Summary of work under appropriation for improvement and repairs for year ending June 30, 1925

Standard asphalt pavement	square yards	107,280
Standard asphalt surface	do	38,957
Asphalt surface pavements (blanket treatment)	do	14,059
Vitrified block gutter	do	7,105
Cement concrete roadway pavements	do	112,279
Old cobble and granite block removed	do	18,294
Granite and bluestone set	linear feet	12,998
Cement curb formed and laid	do	62,731
Grading	cubic yards	170,017
Cement concrete sidewalks (assessment and permit work)	square yards	19,528.24
Cement concrete sidewalks (around Government reservations)	square yards	3,717.69
Cement concrete alleys (assessment and permit work)	do	82,911

The following is the list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1925.
Tables B and C.—Statement of character and extent of street pavements.
Table E.—Street improvements.
Table F.—Repairs to asphalt and coal-tar pavements.
Table G.—Work done for street railway companies.
Table H.—Work done by day labor under appropriation for "Repairs to streets, avenues, and alleys."
Table I.—Regular permit work.
Table K.—Assessment work.
Table L.—Replacing and repairing sidewalks and curbs around public reservations.
Table N.—Whole-cost work.
Table O.—Repairs to cuts by plumbers and others.
Table P.—Grading streets, alleys, and roads.

Of the above tables, B, C, and O are printed herewith. The remaining tables are on file in the record room of the office of the engineer of highways, plan case No. B-1227.

The outstanding feature of the year's construction program in this division was the work made possible by the tax on motor vehicle fuels amounting to over $900,000 distributed to 14 separate streets. This and some other increments added over $1,100,000 to the amount of our annual expenditures in excess of the preceding year's total. Due to the fact that the collection of the gasoline tax, month by month, limited the work payable therefrom that could be executed to the current balance of collections, a certain retardation of this part of the year's work resulted, but despite this limitation all the work authorized by appropriation was completed or under contract and nearing completion at the end of the fiscal year.

The fund of $45,000 for paving roadways on deposit of half cost by the property owners in advance of the work was used in full before the end of the year and a considerable number of applications for its use were deferred to the next fiscal year.

Construction cost, as expressed by contract prices, unit costs of material, and rates paid laborers and mechanics were without material change from the preceding year; such slight variants as were noted being as a rule increases.

The systematic improvement by paving of the main suburban roads was continued, approximately $600,000 being thus applied. About 70 residential streets, each from one to several squares in length, were paved; this duty being almost entirely a reflection of builder's activities, responsive to the housing shortage. The demands for this service were greater than even this liberal program could meet and a still greater paving program in this field will be needed.

The amount of resurfacing of asphalt pavements that could be done was about one-third of that necessary to prevent increase in the average age of the total yardage of this type—an average now far beyond that of any other municipality and evidenced by the deteriorated condition of the older streets, especially in the early weeks of the working season. In recognition of this more liberal funds have been provided for the coming year, but there is a long arrearage of neglect to be made up. A moderate additional use of Bessonite was made on Seventh Street from Pennsylvania Avenue

to G Street south. The examples of this form of surfacing laid in the past year or two exhibit satisfactory evidences of durability and further use will be made of the type.

The fund used in common for sidewalk and alley paving was not sufficient for the demands. In recent years we have limited such construction to unpaved spaces when the abutting property was practically fully built up. No replacements of inferior pavements can now be undertaken. The principal cause of this situation is garage construction in unpaved alleys—largely suburban. Alley pavements required three-quarters of the total fund during the year—while the preceding year's fraction was two-thirds, and in the recent past and rather constantly the fraction was one-third. Even with the strict limitation on selection as stated, the work ordered on majority petition is far in excess of available funds at all times. All this work is assessable and it is regrettable that we make so poor a response in service to perfectly equitable requests.

A significant increase in the extent of repairs to pavements cut for underground installations occurred in the year's record of $435,000 for this work compared with about $370,000 for the preceding year. The individual items making up this total exceeded 60,000; every type of surface was involved in these repairs; the work was conducted, in effect, on a charge basis of 5 per cent addition to labor and material and the fund is self-maintaining and thoroughly solvent.

An item of the year's work of a type and location that gave it a community interest was the widening of the roadway of Thirteenth Street NW. from F to I from 40 to 70 feet. The streets in the business section are generally needful of having their excessive sidewalk widths reduced and their roadways widened. This should be progressively undertaken and public satisfaction with the result is confidently foreseen.

MUNICIPAL ASPHALT PLANT

The total output of the municipal asphalt plant for the year was 213,528 cubic feet of material, consisting of 163,824 cubic feet of old material and 49,704 cubic feet of topping mixture. The plant was operated for 242½ days, with an average daily output of 880½ cubic feet. In connection with the output of the plant, the crusher was operated for 77 days during the year and 4,256 cubic yards of old material hauled to the plant from various streets was crushed.

Constant attention is given to the maintenance of both the plant and the crusher, repairs being made and parts replaced when necessary, thereby keeping them in the best operating condition possible. This cost is incorporated in the total cost of output shown below.

The following material in amounts and cost average set forth below were purchased for use in manufacturing the output during the year:

Limestone dust, 160 tons	$5.45
Sand, 4,476.50 cubic yards	1.40
Asphaltic cement, 680.68 tons	20.04

There were purchased for use in operating the crusher and mixer the following large items and the cost average:

Fuel oil, 42,008 gallons	$0.06
Coal, 199.63 tons	6.00
Wood, 100 cords	15.61

The cost of operation, including labor and material, are kept from day to day, and the summary of this data for the fiscal year develops the following unit costs for the year's operation:

Operation of crusher

(Period of operation, 77 working days; output of crusher, 4,256 cubic yards)

Cost of crushed product per cubic yard:	
Labor and fuel	$1.38
Maintenance, renewals, and repairs	.17
Overhead cost: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
Total cost	1.55

Operation of plant

(Period of operation, 242½ days; total output, 213,528 cubic feet)

	Cents
Total manufacturing cost per cubic foot:	
Labor	7.48
Fuel oil	1.21
Coal	.52
Wood	.39
Total cost	9.60
Haul from plant to street, labor	5.56
On street:	
Labor	25.12
Painting joints	.39
Fuel	.33
Total cost	25.84
Maintenance and repairs:	
At plant	2.40
On street	.14
Total	2.54
Overhead: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.	
Supervision:	
Foremen and overseers	4.70
Total manufacturing cost per cubic foot:	
Plant labor	9.60
Hot haul	5.56
Street work	25.84
Maintenance of plant and tools	2.54
Supervision	4.70
Total	48.24

The sand used was bought under contract at 80 cents per cubic yard and hauled from the wharf to the plant at the cost of $2,685.90

for 4,476.50 cubic yards, or $0.60 per cubic yard, a total of $1.40 per cubic yard. All other expendable material was delivered at the plant site at the cost thereof used herein.

The cost of a cubic foot of old material from the above was as follows:

58.62 pounds of old material, at $1.55 per cubic yard	$0.0400
33.27 pounds sand, at $0.80 per cubic yard; hauled, $0.60 per cubic yard	.0205
3.30 pounds limestone dust, at $5.45 per ton	.0090
5.01 pounds asphaltic cement, at $20.04 per ton	.0502
Cost of material	.1197
Manufacturing and placing cost	.4824
Total cost per cubic foot	.6021

Topping mixture:

94.21 pounds of sand, at $0.80 per cubic yard; hauled, $0.60 per cubic yard	.0581
9.58 pounds limestone dust, at $5.45 per ton	.0261
9.58 pounds asphaltic cement, at $20.04 per ton	.0960
Cost of material	.1802
Manufacturing and placing cost	.4824
Total cost per cubic foot	.6626

The total cost of minor repairs to sheet asphalt and asphaltic concrete pavements during the year, the same representing the maintenance cost during the year, was $96,859.74. This cost represented the maintenance of all asphalt and asphaltic concrete streets not under guaranty by contractors, a total yardage of 3,689,132. The cost per square yard per year was therefore about 2.62 cents.

For purposes of record and comparison the like annual costs are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 cents; 1919, 3.07 cents; 1920, 3.38 cents; 1921, 3.75 cents; 1922, 2.69 cents; 1923, 2.22 cents; 1924, 1.89 cents.

During the year there was purchased from the Cranford Co., under contract No. 8321, the following material in bulk at contractor's plant, to be used in connection with minor repairs to asphalt pavements and repairs to cuts.

14,832 cubic feet of topping, at $0.55 per cubic foot	$8,157.60
12,540 cubic feet of binder, at $0.45 per cubic foot	5,643.00
Total	13,800.60

This material was hauled from the plant and laid in the streets by the District of Columbia minor repair forces. This procedure was following the policy of previous years, as the municipal plant alone could hardly have met the aggregate need of our work and was not subjected to the injurious strain of attempting it.

In connection with these costs of annual repair it should be considered that some of the streets approximate an age of 40 years and that the average age of those we have resurfaced in recent past years

exceeds 25 years. The average age of streets resurfaced in 1910 was 25.8 years; in 1911, was 24.5 years; in 1912, was 25.8 years; in 1913, was 26 years; in 1914, was 28.5 years; in 1915, was 28 years; in 1916, was 29.6 years; in 1917, was 27 years; in 1918, was 26 years; in 1919, was 26.7 years; in 1920, was 23.6 years; in 1921, was 23.2 years; in 1922, was 28.7 years; there was no resurfacing done in 1923 and very little in 1924; in 1925, was 28 years.

STREETS

Repairs to streets, avenues, and alleys, appropriation 1925, were made under the immediate supervision of the superintendent of streets, as follows:

Brick sidewalk relaid	square yards	10,345
Asphalt block paved	do	780
Asphalt block repaved	do	9,823
Vitrified block paved	do	1,636
Vitrified block repaved	do	9,464
Curb reset	linear feet	502
Granite block laid	square yards	3,487
Cement walk relaid	do	10,371
Grading	cubic yards	3,114
Labor		$132,861.74
Material		14,221.18

SUBURBAN ROADS

The appropriation for repairs to suburban roads and suburban streets was $275,000, and the appropriation for grading streets, alleys, and roads was $50,000. Approaches were adjusted and surfaces relaid at the end of all newly paved streets, which work was charged to the various appropriations for paving. All cuts by plumbers and others in the suburban sections were repaired.

The very large amount of building being done in the suburban area and the consequent wear on street surfaces of all kinds has greatly increased the amount of work to be done by this organization. A great number of new unpaved streets opened and built upon during the year were added to the number to be maintained until they can be paved, requiring a corresponding increase in expenditures for work of a temporary character.

A heavy surface treatment was applied to Sixteenth Street NW. from Columbia Road to Alaska Avenue and to various other streets which are heavily traveled.

The following list shows the work done and materials used:

Cinders furnished	cubic yards	24,515.24
Ashes, from collections	do	4,000
Surfaced with cinders	square yards	147,090
Bituminous surface treatment	do	723,658
Heavy tar applied	gallons	76,445
Light tar applied	do	70,259
Asphaltic road oil applied	do	60,624
Bituminous patching material	do	134,300
Dust-laying oil appplied	do	70,592
Stone delivered and used	tons	16,883.35
Gravel delivered and used	do	3,977.05
Bituminous cold patch mixture	do	11,463.30

During the fiscal year the following main suburban roads were paved, under special appropriations, placing them in a class requiring very little maintenance:

Bladensburg Road NE., completed to the District of Columbia line.
Georgia Avenue NW., paved to Fern Street.
Wisconsin Avenue NW., from Massachusetts Avenue to River Road (one side only completed).
Forty-first Street NW., Davenport Street to Livingston Street.

BRIDGES

The expenditures from the appropriation for the construction and repair of bridges amounted to $29,845.44, and the unexpended balance was $365.09.

The principal items of work were:

Pennsylvania Avenue Bridge SE., paint, partial	$2,518.58
Benning Road Bridge, paint	2,884.66
Calvert Street Bridge, refloor sidewalk	2,148.02
Minnesota Avenue Bridge, reconstruct	3,434.32
Dangerous holes and minor repairs	10,946.96
Salaries	5,247.43
Lumber	1,775.79
Construction materials other than lumber	2,480.43
Paint	1,565.78
Reconstruction of portions of N Street trestle and bins	19,852.00
Construction of concrete abutments in line of Minnesota Avenue NE	4,244.68
Construction of concrete culverts in line of Potomac Avenue and Manning Place	6,101.12
Repair to operating machinery on the Highway Bridge	7,930.79
Reflooring of the Pennsylvania Avenue Bridge (exclusive of asphalt surfacing)	26,466.12
Emergency repairs to draw of the Anacostia River Bridge	1,259.42

ENGINEER STABLES

The engineer stables are located at U Street NW., between Sixteenth and Seventeenth Streets, and Second and Canal Streets SW. The animals are assigned to the various departments as follows:

Sewer division	11
Repair shop	22
Repairs to cuts	5
Sealer of weights and measures	1
Electrical department	1
Extra horses	5
	45

Number of annual employees: One superintendent, one blacksmith, two drivers, two watchmen.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

C. B. HUNT,
Engineer of Highways.

To the ASSISTANT ENGINEER COMMISSIONER.

TABLES B AND C.—*Character and extent of roadway pavements July 1, 1925*

SQUARE YARDS

Section	Asphalt	Asphaltic surface	Asphalt block	Asphaltic concrete, concrete base	Asphaltic concrete, stone base	Cement concrete	Durax block (small granite block)	Granite and rubble
Northwest	1,823,819	5,335	23,990	9,674	6,372	20,999	12,294	91,292
Northeast	421,922	----------	193,962	3,127	----------	11,825	----------	17,601
Southeast	288,693	----------	233,721	8,019	4,082	2,509	----------	25,319
Southwest	291,550	27,323	40,436	13,535	----------	11,148	----------	116,867
Georgetown	156,171	----------	23,076	4,144	905	----------	5,674	30,492
Northwest suburban	416,745	65,562	84,046	25,855	24,501	371,821	----------	4,006
Northeast suburban	90,255	8,346	6,925	14,354	----------	128,550	----------	----------
Southeast suburban	21,203	35,532	----------	----------	3,049	21,522	----------	1,000
Total	3,510,358	142,098	606,156	78,708	38,909	568,374	17,968	286,375

Section	Vitrified block	Cobble	Macadam (estimated)	Gutters on asphalt streets	Gutters on asphaltic concrete streets	Pavements maintained by street railroads	Total
Northwest	9,855	5,763	19,054	119,908	1,128	287,110	2,436,503
Northeast	3,882	----------	30,416	33,452	231	69,316	785,734
Southeast	----------	13,122	45,465	20,349	898	48,328	690,505
Southwest	3,138	7,070	10,136	24,927	1,254	56,820	604,204
Georgetown	515	10,419	3,000	5,979	498	35,325	276,198
Northwest suburban	----------	----------	1,187,101	30,960	4,517	79,771	2,294,892
Northeast suburban	----------	----------	289,593	6,383	1,049	25,356	570,811
Southeast suburban	----------	----------	29,541	6,385	272	14,781	133,285
Total	17,390	36,374	1,614,306	248,352	9,847	616,807	7,792,222

MILEAGE

Section	Asphalt	Asphaltic surface	Asphalt block	Asphaltic concrete, concrete base	Asphaltic concrete, stone base	Cement concrete	Durax block (small granite block)
Northwest	93.78	0.34	1.45	0.51	0.24	1.15	0.30
Northeast	22.13	----------	8.58	.19	----------	.80	----------
Southeast	15.31	----------	11.72	.43	.17	.16	----------
Southwest	15.81	1.49	2.37	.68	----------	.36	----------
Georgetown	9.30	----------	1.51	.49	.06	----------	.27
Northwest suburban	23.08	5.09	4.52	1.31	1.48	19.90	----------
Northeast suburban	5.64	.63	.63	.97	----------	6.25	----------
Southeast suburban	1.83	2.92	----------	----------	.21	1.06	----------
Total	186.88	10.47	30.78	4.58	2.16	29.68	.57

Section	Granite and rubble	Vitrified block	Cobble	Macadam (estimated)	Gravel and unimproved (estimated)	Total
Northwest	5.11	0.50	0.08	0.80	2.46	106.72
Northeast	.87	.24	----------	1.60	3.66	38.07
Southeast	1.44	----------	.66	2.15	5.86	37.90
Southwest	5.96	.27	.30	.49	2.62	30.35
Georgetown	2.12	.03	.48	.06	.76	15.08
Northwest suburban	.10	----------	----------	74.44	60.73	190.65
Northeast suburban	----------	----------	----------	22.98	51.46	88.56
Southeast suburban	.04	----------	----------	2.22	38.25	46.55
Total	15.64	1.04	1.52	104.74	165.80	553.86

TABLE O.—*Number of square yards and cost of repairs to cuts made in various streets, sidewalks, and alleys, charged to plumbers, public service corporations, individual depositors, and various appropriations of the District and Federal Governments, during the fiscal year ending June 30, 1925.*

Repairs charged to—	Flat rate	Whole cost	Total
Plumbers	$20,078.62		$20,078.62
Public service corporations	76,718.64	$176,800.04	253,518.68
Individual depositors	27,268.21		27,268.21
Various appropriations of the District and Federal Governments	52,278.55	82,327.88	134,606.43
Total	176,344.02	259,127.92	435,471.94

Repairs made to—	Flat rate	Whole cost
Square yards:		
Sheet asphalt	$5,748.63	$17,022.32
Vitrified block	1,348.58	1,986.68
Asphalt block	1,477.99	9,229.15
Granite block	704.67	6,050.65
Cobble	194.68	674.29
Cement sidewalks	25,009.34	
Macadam	2,549.88	1,356.85
Concrete roadways	4,260.44	1,669.11
Scoria	11.90	2,674.46
Durax	6.81	8,690.04
Brick sidewalks	5,868.33	16,155.08
Total	47,151.26	60,608.63

REPORT OF THE INSPECTOR OF ASPHALTS AND CEMENTS

WASHINGTON, D. C., *August 26, 1925.*

SIR: I have the honor to submit the following report of operations of this division during the fiscal year ending June 30, 1925. Total number of samples tested, 21,464; records of each on file in office.

ASPHALT PAVEMENTS

There were laid by McGuire & Rolfe (Inc.) approximately 14,059 square yards of asphalt concrete, sand-topping mixture (Bessonite), this in resurfacing old macadam and granite block roadways.

This is the fourth year this type of surface has been used by the District, and has thus far given satisfactory service.

CONCRETE ROADWAYS

There were also laid by contractors 112,279 square yards of concrete roadways, the aggregate was plant proportioned in batches and mixed on site of work. Results of compression tests show a maximum of 3,495.42 and a minimum of 1,984.07, with a general average of 2,750.41 pounds per square inch.

PORTLAND CEMENT

Number of samples tested, 18,701, representing 187,043.75 barrels, with 2,188.50 barrels rejected.

Ten tables showing in detail materials tested, results thereof, and by whom submitted, are on file in this office.

Very respectfully, V. CLEAVER,
Inspector of Asphalts and Cements.

To the ENGINEER OF HIGHWAYS.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS

WASHINGTON, D. C., *August 10, 1925.*

SIR: I have the honor to submit my annual report of the operations of the trees and parkings division for the fiscal year ended June 30, 1925.

TREES PLANTED

Young trees to the number of 2,230 were planted in their permanent positions on the streets during the fiscal year, a net increase of 1,196 over the previous year. An extra effort made during the year to extend the tree system along the streets in the suburbs and hitherto unplanted localities resulted in 1,870 trees being planted along many improved thoroughfares. The increase in mileage of street trees was approximately 21 miles, the largest increase yet accomplished. This, however, is accounted for by the fact that it was found that the distance between trees should be increased in order to prevent serious interference with private property in after years. Sixty-seven trees were planted along the streets to replace trees removed because of street improvements and 293 were planted for the purpose of filling vacancies in existing rows.

The cost of planting 2,189 trees was paid from the appropriation for the trees and parking division; 36 from the appropriations for other departments, and 5 from whole-cost deposits. These trees were all planted at the curb line.

The loss of our nurseries a few years ago has proven to be a serious matter. It has been impossible to obtain trees from our nurseries in sufficient numbers to keep pace with the rapid growth of the city and its street improvements in the past few years. Last fall it was necessary to purchase 700 Norway maples and 300 red oak trees from private nurseries for street planting.

The sum of $19,920 was expended for labor and material for tree planting along the streets during the year.

TREES REMOVED

A total of 1,998 trees were removed during the year for various reasons. Of these, 263 were decayed and dangerous, 4 were of a condemned variety, 4 to relieve excessive shade, 2 interference with parking improvements, 472 street improvements, 52 for driveways, 27 improvements of alleys, 33 destroyed by automobiles, 145 storms, 7 interference with vehicular traffic, 4 interference with entrance to buildings, 5 close proximity to buildings, 8 interference with building operations, 1 interference with street lamps, 2 menace to persons because they were covered with poison ivy, 1 interference with construction of sewer. It was ascertained that 66 trees were killed by illuminating gas, 23 by salt water, 35 by abnormal moisture, 13 by being filled around, 6 by being girdled, 131 by drought, 2 by insects, 18 by root mutilation, 1 by oil, 2 by horse bite, and the deaths of 671 were unexplained. Of the total number removed, 1,655 stood at the curb line, 206 in the parking, 55 in the sidewalk, 19 in alleys, 62 in roadways, and 1 on private property.

The cost of removing 1,499 trees was paid from the appropriation for the trees and parking division, 400 from the appropriations for

other departments, and 99 from whole-cost deposits. The cost of removing the trees paid from the appropriation for the trees and parking division amounted to a total of $4,930.78.

TREES SPRAYED

The trees of this city suffer each year from the attacks of the elm-leaf beetle, the tussock moth, and the fall webworm. The spraying of the city trees with arsenate of lead has become an annual necessity in order to preserve their foliage. This department sprayed 48,509 trees during the year for the extermination of the leaf-eating insects, a net increase of 38,899 over the previous year.

The sum of $2,164.65 was spent for labor and material to spray the trees on public space.

NURSERIES

The Fort Dupont and Poplar Point nurseries are well stocked with small trees of the varieties considered best for street planting. Approximately 75 acres was recently loaned this department for nursery purposes. In this tract there is some cleared ground that can be used for growing street trees, thus relieving to some extent the scarcity of nursery stock.

This department transplanted 953 gingko, 855 willow-leaf oak, 346 elm, 403 Norway maple, 94 red oak, 153 lombardy poplar, and 90 acacia trees to the nursery rows at the Poplar Point nursery.

The sum of $9,226.44 was expended for nursery work.

TRIMMING

No systematic trimming was undertaken during the year, but considerable attention was given by a comparatively small force of men to the many individual requests for trimming trees possessing objectionable or dangerous limbs, etc. A total of 6,454 trees were trimmed during the year at a total cost of $5,939.88.

In addition to the work done on the individual requests mentioned above, the same force attended to the miscellaneous casualties to trees and boxes reported by the police department. This casualty work was performed at a total cost of $1,450.66.

The sum of $340.38 was expended in removing broken limbs, trees, etc., from the streets caused by storms.

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES

The cultivation of small trees for four or five years after they have been transplanted to the street is absolutely necessary to insure good growth. The cultivation of the soil adjacent to the tree permits air to reach the roots, renders more available the plant food the soil contains, allows young trees to derive the fullest benefit from rainfall, and prevents the rapid evaporation of moisture. A total of 6,621 young trees were cultivated during the year at a total cost of $1,479.16.

The sum of $3,575.67 was expended during the year for the removal of weeds from uninclosed parkings along the streets, and the sum of $166.92 for the miscellaneous care of the small reservations under the control of the Commissioners of the District of Columbia.

There were 1,826 wooden tree boxes and 342 iron tree guards removed from the large trees throughout the city.

PAVING AROUND TREE SPACES

The work of paving abandoned tree spaces throughout the city was performed by the surface division, and the cost paid from the appropriation for the trees and parking division, a total of $244.63.

REGULATION OF TERRACES

This office issued 1,528 permits affecting the grade of terraces in connection with building operations in the residential districts during the year. We have had very little trouble with builders relative to maintaining uniform parking grades.

GENERAL COMMENT

The beauty of Washington lies primarily in its elaborate system of shade trees. It is this that immediately impresses strangers, particularly those from foreign countries, on their first visit to this city. It would seem, therefore, that when the first cost of setting out trees is known to be so insignificant when compared with their increased value a few years later, that an adequate appropriation would be provided, not only to keep up with the rapid growth of the city but to enable this office to maintain the trees that already exist. Trees on the streets are growing under the most adverse conditions and require constant care. Money, therefore, expended in planting trees when this office has insufficient funds to care for them is wasted. Under present conditions this office is confronted with the alternative of planting at a sacrifice to the existing system, or giving proper attention to the existing trees and not attempting to plant the new streets. This condition will prevail until more funds are provided.

It has been the policy of this office to try to please residents of this city in all of their requests; but I fear many will have to be disappointed unless larger appropriations are placed at our disposal.

SUMMARY

Curb trees on the streets at close of fiscal year 1924	104,294
Net increase of curb trees during fiscal year 1925	575
Curb trees on the streets at close of fiscal year 1925	104,869

Very respectfully,

C. LANHAM,
Superintendent Trees and Parking.

To the ASSISTANT ENGINEER COMMISSIONER.

REPORT OF THE SURVEYOR

WASHINGTON, D. C., *August 29, 1925.*

SIR: I herewith submit report of the operations of the office of the surveyor of the District of Columbia for the year ended June 30, 1925.

The work of this office is divided, more or less, into three classes:

1. Work performed for private parties, for which fees are charged as prescribed by order of the commissioners. Where not covered by schedule of fees, estimate is made covering the actual cost of the work to be performed.

It is not the purpose of the District to charge more than the actual cost of the work performed, and service is rendered the public with a view to making no profit.

2. Work done for the various departments of the District and Federal Government, for which no fees are charged.

This work has very largely increased during the past year, especially since the creation of the National Capital Park Commission.

3. Work done in connection with condemnation cases for the opening of streets and alleys, parks, school and playground sites, etc.

The work for the fiscal year shows a large increase over any previous year, as is shown by report of the work in detail herein submitted.

The number of surveys made during the past fiscal year was 3,505 as compared to 2,573 made the year previous.

Seven thousand and sixty-six new lots in subdivisions have been created as compared to 4,208 the previous year.

Orders for work done during the past fiscal year amounted to 14,001 as compared to 11,707 for the previous year.

This will show an average of about 45 orders for work per day for the entire year.

This is for work actually done, and does not include the constant service rendered by the office force to the public applying at this office for information regarding land descriptions, title matters, subdivision and survey information, and a great variety of miscellaneous information connected with land title and development matters.

The receipts collected for private work during the past year amounted to $55,809.95 as compared to $43,925.50 for the previous year.

This is the largest amount of money ever collected for private work by the surveyor's office; and, allowing for official work performed, more than makes the office self-sustaining.

The total number of plats prepared by the office force for the past year was 16,300 as compared to 14,315 the previous year.

This large increase has been handled without any additional office force, and has required the most energetic application by the drafting force of the office.

The following detail report covering all the work performed by this office is submitted for your information:

1. Work for private parties—survey work: Number of individual lots surveyed: Past fiscal year, 6,017; year previous, 5,536.

Certificate (or plats of survey) issued: Past fiscal year, 3,503; year previous, 2,573.

Surveys to locate foundation walls of buildings being erected: Past fiscal year, 2,209; year previous, 1,626.

Number of buildings inspected in connection with foundation-wall surveys: Past fiscal year, 1,372; year previous, 1,356.

Surveys of unsubdivided county tracts: Past fiscal year, 319; year previous, 344.

Subdivisions: Subdivision plats prepared in duplicate: Past fiscal year, 584; year previous, 547.

Subdivisions recorded: Past fiscal year, 572; year previous, 456.

Total number of lots in subdivisions recorded: Past fiscal year, 7,066; year previous, 4,208.

Plats issued in connection with permits: Plats made to accompany applications for building permits (commonly called "building plats"): Past fiscal year, 6,478; year previous, 6,553.

Plats made up under regulations covering zoning law for the erection of garages, motors, etc.: Past fiscal year, 268; year previous, 403.

Miscellaneous plats: Plats of all kinds made up on order of private parties: Past fiscal year, 11,188; year previous, 10,431.

Estimates issued and fees collected: Estimates of cost (issued in triplicate): Past fiscal year, 14,001; year previous, 11,707.

Total of fees paid to collector of taxes, District of Columbia, for work done by surveyor's office: Past fiscal year, $55,859.95; year previous, $43,925.50.

2. Work for the District of Columbia and Federal Government: Surveys: Past fiscal year, 142; year previous, 125.

Plats recorded (condemnation, dedications, etc.): Past fiscal year, 118; year previous, 117.

Reports to inspector of buildings concerning foundation walls in course of erection: Past fiscal year, 2,209; year previous, 1,636.

Assessment and taxation plats recorded: Past fiscal year, 420; year previous, 1,152.

3. For the District of Columbia and private parties: Total number of surveys made for the District of Columbia and private parties: Past fiscal year, 6,209; year previous, 4,679.

Total of plats, public and private (including plats drawn in books): Past fiscal year, 16,300; year previous, 14,315.

With this report is submitted a table showing in convenient form the work performed the past fiscal year and the year previous.

SURVEYS TO MARK PERMANENT SYSTEM OF HIGHWAYS

The appropriation of $2,000 to be used for marking the permanent system of highways on the ground by permanent monuments has been used to splendid advantage.

In the creation of new subdivisions if it were not possible to mark block corners permanently it would add a large cost to any subsequent survey of the lots in the subdivision.

Many new blocks have been marked by granite monuments. These constitute a permanent reference for future surveys.

REVISION OF THE HIGHWAY PLAN

The appropriation of $1,500 for the revision of the highway plan has also been advantageously used. Several studies have been made and not yet submitted for final action by the commissioners and the highway commission. Others have been made a matter of record. This has been made necessary on account of changed conditions since the highway plan was adopted.

More money could be used very advantageously for this work, especially since the creation of the National Capital Park Commission.

The acquisition of park areas, in many cases, necessitates a change in the highway plan to fit new conditions arising by reason of the acquisition of these park areas. No park should be acquired without a study of the highway plan, and both should be made to harmonize.

This office feels, however, that the proper location of highways for the orderly development of private property and the proper provisions for future traffic is of great importance and should not be sacrificed.

CONDEMNATIONS

This office has charge of the work of preparing descriptions and plats for all condemnation cases to be prosecuted in court. This necessitates a vast amount of work by this office, such as accurate surveys of the property to be condemned, computations and plats based on actual surveys and the furnishing of expert information to the jurors by the engineers of this office.

During the past fiscal year there were before the courts 52 condemnation cases. Of this number 36 were miscellaneous cases for the acquisition of streets, parks, etc., and 16 for the acquisition of land for the public alleys. Of the total number of cases in court 15 were confirmed, 4 dismissed, and 33 are still pending. In addition to these cases, there were 10 cases ordered by the commissioners which have not yet been filed in court.

The damages awarded by the juries in the cases which have been confirmed amounted to $369,296.93 for the miscellaneous cases, and $8,532.10 for the alley cases.

A table is filed in this office showing in detail the condemnation cases pending in court, the cases filed, and the cases confirmed during the past fiscal year, giving the amount awarded as damages and the amount assessed as benefits in each case confirmed.

STREET EXTENSIONS

Following is a list of streets acquired by condemnation or dedication which have been placed on the record books of this office during the past fiscal year:

Northampton Street between Connecticut Avenue and Thirty-ninth Street NW.

Owen Place between Montello Avenue and West Virginia Avenue.

Twenty-ninth Street between Calvert Street and Woodley Road NW.

Somerset Place between Eighth and Ninth Streets NW.

Woodley Road between Thirty-fourth Street and Wisconsin Avenue NW.

Forty-fourth Street between U Street and Calvert Street NW.

W Street between Ridge Road and Forty-fourth Street NW.

Twenty-eighth Street between Albemarle Street and Brandywine Street NW.

Brandywine Street between Linnean Avenue and Broad Branch Road NW.

Chesapeake Street east of Linnean Avenue NW.

Chesterfield Place east of Linnean Avenue NW.

Davenport Street (Military Road) between Linnean Avenue and Broad Branch Road NW.

Broad Branch Road (widening) between Davenport Street (Military Road) and Albemarle Street NW.

Forty-fourth Street between Fulton Street south to Parcel 18/56 NW.

Fulton Street (widening) east of Forty-fourth Street NW.

Broad Branch Road (widening) between Rock Creek Park and the District Line.

Nevada Avenue between Thirty-second Street and Chappel Road (Thirty-sixth Street) NW.

Thirty-second Street at intersection of Broad Branch Road NW.

Ninth Street south of Irving Street NE.

Irving Street between Ninth and Tenth Streets NE.

Twenty-ninth Street at intersection of Audubon Terrace NW.

Tenth Street between Spring Road and Quincy Street NW.

Observatory Place south of W Street NW.

Sheridan Street between Seventh and Eighth Streets NW.

Rodman Street (widening) between Thirty-fifth Street and Idaho Avenue NW.

Ninth Street between Irving and Jackson Streets NE.

Seventh Place between Farragut and Gallatin Streets NW.

Quarles Street at intersection of Twenty-ninth Street NE.

Forty-ninth Street between Nash and Quarles Streets NE.

Nash Street between Forty-eighth Place and Forty-Eighth Street NE.

Nevada Avenue between Rittenhouse Street and Western Avenue NW.

Tenth Street between Evarts and Franklin Streets NE.

Wisconsin Avenue and P Street NW., widened at their intersections.

Van Buren Street at intersection of Piney Branch Road.

Piney Branch Road at intersection of Van Buren Street.

Whittier Street between Third and Fifth Streets.

Fifth Street between Van Buren and Whittier Streets.

Albemarle Street between Forty-second Street and Forty-Fourth Streets NW.

Forty-third Street south of Murdock Mill Road.

Otis Street between Eighteenth and Twentieth Streets NE.

Eighteenth Street between Newton and Otis Streets NE.

Twentieth Street between Newton and Otis Streets NE.

Tenth Street between Franklin and Girard Streets NE.

Nebraska Avenue south of Jenifer Street NW.

Ingomar Place between Nebraska Avenue and Chevy Chase Parkway NW.

Jenifer Street west of Nebraska Avenue NW.

Trenton Street between Fifth and Sixth Streets SE.

Fifth Street between Tuckerman and Van Buren Streets NW.

Underwood Street at Fifth Street NW.

Appleton Street east of Thirty-eighth Place.

Nichols Avenue (widening) between Good Hope Road and S Street SE.

Eighteenth Street between Blagden Avenue and Blagden Mill Road (Colorado Avenue) NW.

Colorado Avenue (widening) between Seventeenth and Eighteenth Streets NW.

Howard Street (widening) between Argonne Place and Lanier Place NW.

Underwood Street, Van Buren Street, and Whittier Street, between Fourteenth and Sixteenth Streets NW.

Luzon Avenue between Underwood and Fourteenth Streets NW.

Fourteenth Street north of Luzon Avenue NW.

Thirty-ninth Street (widening) between Garfield Street and Cathedral Avenue NW.

Argyle Terrace south of Varnum Street.

PARKS

During the past fiscal year there were many small park areas recorded in this office, located throughout the various parts of the District, as shown by the following list:

Parcels 144/23, at Sixteenth and Girard Streets, and Brentwood Road NE.

Parcels 144/37 and 144/39, at Brentwood Road, Franklin and Fifteenth Streets NE.

Square 3707, at New Hampshire Avenue, North Capital and Longfellow Streets NE.

Square 5606 at Good Hope Road and Minnesota Avenue SE.

Square West of 1556 at Massachusetts Avenue, Forty-seventh and Upton Streets NW.

In this connection this office desires to call attention to a generous dedication of land for park purposes made by Mrs. Anne Archbold. This tract lies along the west side of Arizona Avenue, extending from the Glover Parkway to Reservoir Road, and will comprise a valuable addition to the park donated by Mr. Charles C. Glover known as the Glover Parkway.

Mrs. Archbold is to be commended for the public spirited and generous motives which prompted the donation of this tract to the District.

The park site selected to be acquired under the $5,000 appropriation for small parks was Square 3638. Many small park sites were needed and should have been acquired, but the small appropriation of $5,000 would not permit of the acquisition of more property for this purpose. Property values having greatly increased during recent years, it is difficult to acquire but a very small amount of ground with such a small appropriation.

HIGHWAY PLAN

The permanent system of highways plan for all that part of the District outside of what is known as the Federal City covered by the L'Enfant plan was adopted prior to 1900, and afterwards recorded in this office. All subsequent opening of streets and the subdivision of land were required to be made in conformity to this plan, except in some minor cases where the plan has been changed in accordance with the requirements of law where it was believed that topographical and changed conditions justified such changes.

Under the present law and regulations streets in accordance with the highway plan can only be acquired when dedicated by the proprietors of the land or where the commissioners deem that the streets should be opened in the public interests, in which case condemnation proceedings are instituted; but in all cases the law requires the entire cost of the land plus the court costs to be assessed as benefits.

There are a great number of proposed streets of vital importance to the proper development of the District in accordance with the highway plan. A comprehensive and orderly development of the highway plan can not, nor will ever be perfected under either of the methods outlined above. These streets form an integral part of the general plan. The acquisition of the land within the lines of these streets must be completed in advance of all physical improvements, such as grading, sidewalks, sewer, water, etc., and it seems to this office that there are few more important matters to be given serious consideration by the commissioners than the opening of these streets. It would be a serious reflection upon the vision and foresight of the present authorities if these streets are not opened before they are blocked by costly improvements. Some important ones have already been blocked by delay in opening them.

There are of course very substantial reasons why these streets can not be acquired under existing law. In many cases small holdings would be entirely wiped out, substantial improvements destroyed, creating a cost that can not in equity be assessed against the property benefited. No jury, under existing law, could find benefits to offset the entire cost as required by law.

This office has prepared a tentative list of streets that should be opened, many of which will never be acquired under existing law on account of the impossibility of finding benefits equal to the damages and court costs. This list comprises over 40 streets and avenues, with approximately a total of 20,000,000 square feet of land at an estimated cost of $7,000,000. Much of this, however, could be assessed back on the land benefited, thereby reducing this cost very materially.

Some of the principal streets which should be acquired are Nebraska Avenue, Reno Road, Foxall Road, Potomac Avenue, Reservoir Road, Utah Avenue, Colorado Avenue, Concord Avenue, Thirteenth and Fourteenth Streets, South Dakota Avenue, Kansas Avenue, Maryland Avenue, New York Avenue, East Capitol Street, Minnesota Avenue, Alabama Avenue, Southern, Eastern, and Western Avenues, and many others of less importance.

Some method should be devised to provide a very substantial fund to inaugurate a policy for the acquisition of all important streets.

This might be done by direct appropriation or by authority to utilize a part of the surplus now in the Treasury to the credit of the District government.

The authority given the commissioners by the last Congress under Public Act No. 349, approved January 30, 1925, to close streets, roads, or highways in the District of Columbia rendered useless by reason of opening new streets in accordance with the highway plan, has been applied in a number of cases to the betterment of the street plan, and has been found to be very beneficial in the resubdivision and development of land.

Commendation is due the employees of this office for their faithful and competent service during the past year in efficiently handling the large volume of work which they have been called upon to perform.

MELVIN C. HAZEN,
Surveyor.

To the ASSISTANT ENGINEER COMMISSIONER.

Table showing in detail work performed by surveyor's office fiscal year 1924–25

	Fiscal year 1923–24	Fiscal year 1924–25
FOR PRIVATE PARTIES		
Individual lots or parts of lots surveyed in city and county	5,536	6,017
Certificates of survey issued covering one or more lots	2,573	3,503
Duplicates of above recorded in survey certificate books	2,573	3,503
Separate surveys made to verify walls	1,626	2,209
Postal card reports concerning walls issued to owners	1,626	2,209
Individual buildings inspected as to location of walls	1,356	1,372
Large tracts in county surveyed, subdivided, and recorded	11	36
Outline surveys in county of unsubdivided tracts	344	319
Subdivision plats prepared in duplicate	547	584
Duplicate subdivisions prepared for assessor	547	584
Subdivisions recorded	456	572
Total of individual new lots in subdivisions	4,208	7,066
Plats of one or more recorded lots to accompany applications for building permits (commonly called "building plats"), in duplicate	6,553	6,478
Plats made up under regulations for theaters, garages, etc	403	268
Estimates of cost issued in triplicate	11,707	14,001
Plats made up on order of private parties	10,431	11,188
Total of fees paid to collector of taxes by private parties	$43,925.50	$55,859.95
FOR THE DISTRICT OF COLUMBIA		
Surveys made for the District of Columbia	125	142
Plats recorded (condemnations, dedications, etc.)	117	118
Reports concerning walls to building inspector	1,636	2,209
Assessment and taxation plats recorded	1,152	420
MISCELLANEOUS		
Total of surveys for the District of Columbia and private parties	4,679	6,209
Total of plats, public and private, including plats drawn in books	14,315	16,300

REPORT OF THE INSPECTOR OF BUILDINGS

WASHINGTON, D. C., *August 1, 1925.*

SIR: I submit herewith the annual report of the building inspection division for the fiscal year 1925.

The report includes no record of building operations conducted by the Federal Government or by the District of Columbia Government.

Statement of permits issued from July 1, 1924, to June 30, 1925

	Number	Value		Number	Value
Brick:			Concrete—Continued.		
Dwellings	3,077	$23,775,195	Swimming pool	1	$3,000
Repairs	1,945	2,874,420	Greenhouse	1	25,000
Apartments	119	14,980,000	Warehouses	4	550,000
Garages	492	913,195	Sheds	5	3,400
Stores	145	2,624,980	Retaining walls	4	20,500
Office buildings	15	2,443,600	Vault	1	1,000
Gas stations	11	86,960	Ambulatory	1	95,000
Churches	10	693,500	Pit	1	400
Stores and apartments	3	87,700	Office building	1	400,000
Hotels	4	845,000	Gas stations	2	6,000
Warehouses	3	179,000	Apartment	1	500,000
Power plant	1	10,000	Bank	1	400,000
Dormitories	2	550,000	Stadium	1	25,000
Storehouses	6	196,500	Tile:		
Boiler houses	4	35,000	Dwellings	32	581,300
Hospitals	2	240,000	Repairs	2	1,575
Charitable homes	5	288,000	Garages	43	49,950
Greenhouse	1	10,000	Store	1	2,000
Service stations	5	28,500	Warehouse	1	7,500
Cleaning plant	1	20,000	Stable	1	10,000
Schools	3	430,000	Metal:		
Laundry	1	4,500	Garages	1,815	369,740
Library	1	500,000	Gymnasium	1	23,000
Community center	1	300,000	Sheds	45	9,155
Lodge	1	47,720	Frame:		
Bank	1	65,655	Dwellings	981	5,249,795
Convent	1	20,000	Repairs	775	361,165
Salesroom	1	15,000	Garages	360	126,625
Sheds	7	12,800	Sheds	150	17,530
Stone:			Ice house	1	1,000
Dwellings	11	201,060	Greenhouse	1	4,000
Repairs	13	49,750	Church	1	400
Garages	2	11,000	Warehouse	1	4,000
Concrete:			Machinery motors	331	144,360
Dwellings	28	384,300	Elevators	117	734,770
Repairs	17	120,705	Boilers	7	11,700
Garages	89	63,975			
Seminary	1	16,000	Total	10,719	62,862,980

Distribution of improvements in sections

	Buildings	Repairs
Northeast	$4,932,590	$276,580
Southeast	2,220,320	188,490
Northwest	29,076,705	3,052,185
Southwest	461,040	79,200
County [1]	21,663,090	912,780
Total	58,353,745	4,509,235
	4,509,235	
Sum total	62,862,980	

[1] County not recorded as a separate section subsequent to February, 1925.

Comparative statement for years 1924 and 1925

	New buildings	Repairs, etc.	Dwellings	Apartments	Business buildings
1925	5,319	5,584	4,129	120	1,070
1924	3,012	5,356	2,079	81	852
Increase	2,123	228	2,050	39	218

Valuation of building operations: [1]

1925	$62,862,980
1924	39,403,207
Increase	23,469,773

[1] Awnings and signs are not regarded as having any structural value for the purposes of this compilation. Their estimated cost, therefore, is omitted.

Permits issued, number of:

1925	11,993
1924	11,446
Increase	547

Estimated number of buildings in the District of Columbia[1]

	Brick	Stone	Concrete	Tile	Frame
1925, erected	3,905	13	134	.77	1,190
1925, razed	116				102
Net total	3,789	13	134	77	1,088
1924	76,263	2	365	416	29,316
Grand total	80,052	15	499	493	30,404

[1] This estimate is necessarily broad, data for an accurate estimate not being available.

Owing to frequent requests, and for comparative purposes, the following auxiliary tabulations should be included in this report:

	New buildings	Repairs, etc.	Dwellings	Apartments	Business buildings	Number of permits	Value of operations
1921	1,605	5,323	772	14	819	8,310	$19,025,291
1922	3,510	5,323	2,397	60	1,053	10,301	36,223,089
1923	3,478	5,938	2,460	81	937	12,191	57,690,038
1924	3,012	5,356	2,079	81	852	11,446	39,403,207
1925	5,319	5,584	4,129	120	1,070	11,993	62,862,980

Schedule of residential buildings, 1925:

One-family houses	4,071
Two-family houses	55
Three-family houses	3
Number of apartments	120
Average number of families	26

The foregoing data, except the schedule of residential buildings, cover the postwar years, during which there has been maintained a volume of building operations approximating a valuation threefold greater than that of any equivalent pre-war period. Nor can this monetary increase be attributed solely, or even in large measure, to the advance in cost of building materials and of labor, for while, admittedly, these factors should be taken into account, the fact remains that the number of buildings, both residential and business, has increased in almost the same proportion as has their valuation. Particularly striking is the estimated cost of building construction for 1925, both singly and in comparison with the other years listed, which represent the greatest volume of work that has ever passed through the department.

$62,862,980 is an amount on a level with those amounts reported by our largest cities, (with the exception of New York, Chicago, and Philadelphia), the population of each of which is far in excess of that of Washington. And as there have existed no abnormal conditions, the only logical inference is that rapid yet healthy growth of the District, merely potential a year or two ago, now seems assured.

As worthy of consideration in this connection, attention is called to the fact that there has been no material increase in the office force since 1921.

The revised building code, which became effective July 1, has not been sufficiently long in operation to justify extended comment upon its workability, etc. Attention is invited, however, to the requirement of freight-elevator inspection by this department, inspectional duty having been heretofore confined to passenger lifts.

There are in use in the District, exclusive of those in United States buildings, 1,153 passenger elevators. These elevators are inspected every three months. It is believed due our elevator inspectors that it should be recorded that during the entire year there occurred but three accidents due to defective apparatus, and but one fatality. This is regarded as little short of remarkable, especially when it is taken into consideration that the force consists of only 4 men, and that they are also charged with the inspection of 69 elevators located in 19 buildings under the control of the Federal Government.

The additional duty of making regular inspections of freight lifts will, it is feared, strain this meager force beyond the point of maintaining the excellent standard they have held in the past.

Attention is directed to the urgent necessity of relief in the matter of signs. During the past year there were 1,806 of these structures for which permits issued. It is compulsory that each permit be followed by an inspection; in the case of large signs, especially those erected upon roofs, several inspectors are necessary to insure safety to the public and compliance with the regulations.

These inspections entail the sacrifice of valuable time which it should be made possible to devote to building construction. The only practicable solution, and in its true sense, the only economical solution, lies in the assignment of one inspector to this work alone. With the present limited force, this is impossible. An additional inspector should therefore be provided.

In view of the desirability of having each division through which the District derives revenue operate upon a self-supporting basis, the following statement is illuminating and worthy of consideration:

	Receipts	Expenses		Receipts	Expenses
1921	$33,781.88	$35,320.39	1925	$78,509.55	$77,743.31
1922	51,126.34	38,075.38			
1923	70,403.48	54,998.98	Total	292,884.40	264,457.54
1924	59,063.15	56,321.65			

The excess of receipts over expenses, $28,426.86, is regarded by this division with gratification and no little pride, particularly as the surplus has not been gained at irksome expense to the public. The same schedule of fees is now in force that has been in operation for years.

The zoning law and regulations, which were at first regarded by a large part of the public with apparent misgiving, and later accepted with rather passive tolerance, are now, generally speaking, indorsed with enthusiasm. Perhaps the most convincing evidence of the salutary effect of the regulations, and the administration of the provisions of the act, is the fact that those most frequently affected from a financial standpoint are warmest in their support.

The courts, too, which were inclined to regard such legislation askance, are coming more and more to the view that so-called zoning is not only a distinct civic step forward but perfectly compatible with the property owner's constitutional rights.

Certificates of occupancy issued during the past year were as follows: Conforming, no fee, 213; nonconforming, no fee, 133; conforming and nonconforming, fee, 2,663; total, 3,009. The fees received amounted to $5,500.

It remains only to say that the foregoing report is the best and indisputable evidence of the growth in the duties and responsibilities of the building inspection division, a bureau that should be recognized as one of the most important in the municipal government. More convincing proof of its major position could not, it is submitted, be adduced.

JOHN W. OEHMANN,
Inspector of Buildings.

To the ASSISTANT ENGINEER COMMISSIONER.

REPORT OF INSPECTOR OF STEAM BOILERS

WASHINGTON, D. C., *August 28, 1925.*

SIR: I have the honor to submit the following report for the fiscal year ending June 30, 1925, together with fees received and expenses incurred:

Boilers inspected	452
Boilers inspected, District of Columbia (no fee)	42
Cases of deposit	35
Cases of defective setting	25
Cases of defective steam gauges	10
Cases of defective tubes	35
Cases of pressure reduced	15
Cases of boilers condemned	5
Total amount received	$2,260
Total amount expended	375
Compensation for inspector	1,885

Very truly yours,

E. F. VERMILLION,
Inspector of Steam Boilers.

To the INSPECTOR OF BUILDINGS.

REPORT OF THE PERMIT CLERK, ENGINEER DEPARTMENT

WASHINGTON, D. C., *August 24, 1925.*

SIR: Report of the operations of the permit clerk's office giving the number of permits issued during the fiscal year ended June 30, 1925, is hereby submitted:

Water connections	4,211
Repairs	724
Specials (no fees)	90
Sewer connections	4,208
Repairs	620
Specials (no fees)	[illegible]

Gas connections	4,246
Repairs	318
Mains, lay and repair	474
Specials (no fees)	11
Electric connections and underground construction	5,283
Repairs	12
Conduits	873
Manholes, build and connect with sewers	271
Specials (no fees)	15
Air pipe lines, lay	3
Fences and hedges to inclose parkings	482
Guardstones in alleys	6
Pave parkings	121
Poles, erect, replace, and remove	1,195
Tanks, install fuel oil	70
Walls, erect retaining	173
Miscellaneous	24
Total	24,231
Permits for work of various kinds for work in public space	7,782
Total	32,013

Fees of $1 were paid for 23,304 permits; permits for which no fees were charged, 7,782.

Record cards were made of all files referred to this office, permits issued, or reports made and files returned to the divisions having supervision of inspections of work for which permits were issued.

Applications were filed according to location, and report of excavations in public space were made for necessary repairs.

H. M. Woodward,
Permit Clerk.

To the Inspector of Buildings.

REPORT OF THE INSPECTOR OF PLUMBING

Washington, D. C., *September 1, 1925.*

Sir: I am handing you herewith the forty-third annual report of the plumbing inspection division of the engineering department.

During the last year there were 24,122 inspections on plumbing work in new buildings, 5,040 inspections of plumbing work in old buildings, and 27,474 inspections in connection with complaints made of conditions of plumbing, and guttering and spouting in old buildings, making a total of 56,636 plumbing inspections made by this office. The average number of inspections made by the field force was a little less than 12 per day, and the largest number of inspections in any one day was 26.

COMPLAINTS

Of the 27,474 complaint inspections made during the year (practically one-half of the entire field work) about one-half were complaints of defective plumbing in old houses, for which correction notices were served, and about one-half related to sheet-metal gutters and rain leaders and leaking roofs. Practically all of the gutter and downspout complaints, all of the leaky roof complaints, and about one-half of the defective plumbing complaints originated from other departments and were referred to this office for prosecution.

POLICE-COURT CASES

During the year 34 warrants were obtained for violation of the plumbing law and regulations. Fifteen of these cases were against unlicensed plumbers and 19 for violation of the plumbing regulations by owners and others. Nineteen of these cases were nolle-prossed on account of the work having been done after service of warrant and before the case was brought to trial. Fines were exacted in 15 cases in a total amount of $280. During the year no cases brought before the court were lost.

PLUMBING BOARD

The plumbing board held 24 meetings and examined 68 plumbers, of whom 8 passed and were granted license, so that at the close of the fiscal year there were 246 registered master plumbers in the District, about 215 of them being actively engaged in business; there were also 6 registered gas fitters.

PUBLIC CONVENIENCE STATIONS

During the last year four convenience stations were opened daily from 6 a. m. to midnight, with two shifts of attendants, each working nine hours per day. The oldest and largest station—that at Seventh Street and Pennsylvania Avenue—accommodated 3,864,208; that at Thirteen-and-a-half Street and Pennsylvania Avenue, 3,070,840; that at Ninth Street and New York Avenue, 3,511,808; and that at Fifteenth Street and Maryland Avenue NE., 2,303,196, making a total patronage of more than 12½ millions of persons using these stations during the year. The cash receipts from the using of pay compartments, telephone commissions, public scales, etc., amounted to $7,227.63, being very nearly one-third of the cost of operation of these stations.

A. R. McGonegal,
Inspector of Plumbing.

To the Assistant Engineer Commissioner.

REPORT OF THE ASSISTANT ENGINEER COMMISSIONER

WASHINGTON, D. C., *October 2, 1925.*

SIR: I have the honor to submit the following reports of the departments and offices under my immediate supervision.

W. H. HOLCOMBE,
Major, Corps of Engineers, U. S. Army,
Assistant Engineer Commissioner, D. C.

To the ENGINEER COMMISSIONER.

REPORT OF THE MUNICIPAL ARCHITECT

WASHINGTON, D. C., *August 24, 1925.*

SIR: I have the honor to submit herewith the following report of the operations of the office of the municipal architect for the fiscal year ended June 30, 1925.

The work in the municipal architect's office consists of the preparation of plans, specifications, and the superintendence of the construction of all buildings erected by the District of Columbia, consisting chiefly of schools, fire-engine houses, police stations, hospitals, and, in addition, the preparation of drawings and estimates for new buildings and repairs to existing buildings for the various municipal institutions, such as the Home for the Aged and Infirm, at Blue Plains; the National Training Schools for both boys and girls, and the new District Training School, at Laurel, Md. Plans of all buildings are submitted to the Commission of Fine Arts for approval before work on contract plans is begun.

The repair shop, which is an adjunct to the municipal architect's office, is charged with the upkeep and repair work required for the various buildings of the school system, as well as other municipal institutions.

A separate report on the repair shop is forwarded herewith.

The development of plans and the construction of buildings for the reformatory and workhouse at Lorton, Va., also comes under this office, and the report of the engineer in charge is forwarded herewith.

The following buildings were under construction at the time of the submission of the last annual report and have since been completed:

Armstrong Technical High School: By the act of June 29, 1922, $100,000 was appropriated for beginning the erection of an addition to this building, to include assembly hall, additional classrooms, shops, and laboratories, and the commissioners were authorized to enter into a contract for said addition at a cost not to exceed $500,000. An additional $200,000 was appropriated by the act of February

28, 1923, and $200,000 more by the act of June 7, 1924. Contract was executed January 19, 1924, with George E. Wyne for the construction of this addition, including plumbing, electrical, and heating and ventilating work, in the sum of $450,700. The work was completed April 4, 1925, at a total cost of $500,037.42. The split system of heating will be employed. Cubic contents, 1,409,790 cubic feet. Cost per cubic foot, 35.47 cents.

Addition to Western High School, located at Thirty-fifth and Reservoir Streets NW.: By the act of February 28, 1923, $100,000 was appropriated for beginning the remodeling of and the construction of an addition to this building to provide a new assembly hall, gymnasiums for boys and girls, and additional classrooms, and the commissioners were authorized to enter into a contract or contracts for said remodeling and extension at a cost not to exceed $550,000. An additional $450,000 was appropriated by the act of June 7, 1924. Contract was executed February 26, 1924, with Parsons & Hyman for the construction work, including plumbing, electrical, heating, and ventilating, in the sum of $478,300. This contract expired February 26, 1925. An additional $32,500 was appropriated by the deficiency act of March 4, 1925, for the construction of a third story, and Parsons & Hyman continued with this work. The contract expired July 30, 1925, and the work was completed at a total cost of $565,110.69. The vacuum, steam direct-indirect system of heating was used in this building. Cubic contents, 1,695,978 cubic feet. Cost per cubic foot, 39 cents.

Mount Pleasant Branch Library, located at Sixteenth and Lamont Streets NW.: Amount donated for this building and equipment by the Carnegie Corporation, $200,000. The plans for this building were prepared by Mr. Edward L. Tilton, of New York. Contract was entered into April 18, 1924, with Schneider-Spliedt Co., for the construction of the building, including plumbing, electrical, heating, and ventilating work, in the sum of $140,140. The work was completed April 1, 1925, at a total cost of $147,353. Cost of furniture and equipment installed, $39,769.82. Cubic contents, 269,629 cubic feet. Cost per cubic foot, 51.96 cents.

Nurses' home at the tuberculosis hospital, located at Fourteenth and Upshur Streets NW.: By the act of February 28, 1923, $35,000 was appropriated for the erection of a nurses' home. Contract was entered into April 11, 1924, with the C. A. Hofferberth Construction Co., for the construction work, in the sum of $33,885. The work was completed September 25, 1924, at a total cost of $34,101.60. The vacuum system of heating was used in this building. Cubic contents, 89,999 cubic feet. Cost per cubic foot, 37.65 cents.

Charles W. Raymond School, located at Spring Road and Rock Creek Church Road NW.: By the act of February 28, 1923, $130,000 was appropriated for the erection of an eight-room extensible building. Advertisement for proposals was made, and proposals were submitted on August 8, 1923, but as all bids exceeded the amount available contract could not be entered into. By the deficiency act of April 2, 1924, an additional $10,000 was appropriated. Contract was entered into April 22, 1924, with Charles H. Tompkins Co., for the construction, including plumbing, electrical, heating, and ventilating work, in the sum of $133,700. The work was completed December 22, 1924, at a total cost of $133,787.99. The vacuum system

of heating was used in this building. Cubic contents, 380,046 cubic feet. Cost per cubic foot, 35.19 cents.

Bernard T. Janney School, located at Wisconsin Avenue and Albemarle Street NW.: By the act of February 28, 1923, $160,000 was appropriated for the erection of an eight-room extensible building, including a combination assembly hall and gymnasium. Contract was entered into July 22, 1924, with George E. Wyne for the construction of the building, including a combination assembly hall and gymnasium, in the sum of $151,837.40. An additional $15,000 was appropriated in the deficiency act of December 5, 1924. The work was completed May 19, 1925, at a total cost of $165,604.35. Cubic contents, 466,490 cubic feet. Cost per cubic foot, 32.55 cents.

Building construction started subsequent to July 1, 1924:

Engine House No. 16, located on D Street between Twelfth and Thirteenth Streets NW.: Additions and alterations. By the act of June 29, 1922, $5,000 was appropriated for repairs to this engine house. By the act of February 28, 1923, an additional $5,000 was appropriated, and by the act of June 7, 1924, a further sum of $15,000 was appropriated. Bids for the work were received June 18, 1923, but they were rejected, as they exceeded the amount available. Contract was entered into August 6, 1924, with the C. A. Hofferberth Construction Co. for additions and alterations in the sum of $15,313. Work was completed January 30, 1925, at a total cost of $20,195.34. Contract was entered into October 10, 1924, with M. B. Casey & Co. for the installation of a heating system in this engine house in the sum of $3,507. This installation was completed January 31, 1925, at a cost of $2,965.50.

Health School, located at Thirteenth and Allison Streets NW.: By the deficiency act of June 16, 1921, the sum of $150,000 was appropriated for the construction of this building. Plans for the building were completed, as early as circumstances would permit, by March 1, 1922. Delay was occasioned in the preparation of the plans and the beginning of building operations by controversies and court action concerning the location of the building. By the act of June 7, 1924, Congress authorized the erection of the building on a part of the site occupied by the Tuberculosis Hospital. Bids were received for the construction of the building August 6, 1924, but all bids were ordered rejected for the reason that the lowest proposal submitted exceeded the amount available. The plans were revised, and bids were again submitted on September 17, 1924. Contract was executed October 7, 1924, with George E. Wyne for the construction of the building, including plumbing, heating, ventilating, and electrical work, in the sum of $136,700. The work was completed July 14, 1925, at a cost of $141,915.53. The direct-radiation vacuum system of heating was installed in this building. Cubic contents, 453,817 cubic feet. Cost per cubic foot, 31.27 cents.

John F. Cook School, located at P Street, between North Capitol and First NW.: The appropriation act of February 28, 1923, authorized the commissioners to enter into contract for the erection of a 16-room building, including combination assembly hall and gymnasium, to replace the John F. Cook School, at a cost not to exceed $250,000, and appropriated $100,000 for the beginning of the erection. By the act of June 7, 1924, an additional amount of $150,000

was appropriated for completing the erection. Contract was executed January 16, 1925, with Skinker & Garrett for the construction of the building, with combination assembly hall and gymnasium, including plumbing, electrical, heating, and ventilating work, in the sum of $237,951. The contract time will expire November 16, 1925. The work to date has cost $238,234. The direct-radiation gravity system of heating will be used in this building. Cubic contents, 775,519 cubic feet. Cost per cubic foot, 30.72 cents.

Engine House No. 29, located at Conduit Road and Reservoir Street NW.: By the act of June 7, 1924, $56,000 was appropriated for house, site, furniture, and furnishings for an engine company to be located in the vicinity of the intersection of Conduit Road and Reservoir Street NW., including the cost of necessary instruments for receiving alarms and connecting said house with fire-alarm headquarters. Contract was executed March 24, 1925, with the C. A. Hofferberth Construction Co. for the construction of this building, including plumbing, heating, and electrical work, in the sum of $49,424. The contract time will expire August 24, 1925. The work to date has cost $49,785.68. The direct radiation, gravity system of heating will be used in this building. Cubic contents, 118,535 cubic feet. Cost per cubic foot, 42 cents.

Truck House No. 13, located at Florida Avenue and Orren Street NE.: By the act of June 7, 1924, $62,000 was appropriated for house, site, furniture, and furnishings for a truck company to be located in the northeast section of the city, in the vicinity of Twelfth and H Streets NE., including the cost of necessary instruments for receiving alarms and connecting said house with fire-alarm headquarters. Contract was executed May 5, 1925, with Allen H. Rogers, for the construction of this building, in the sum of $52,650. The contract time will expire October 5, 1925. The cost to date is within the contract price. The direct radiation, gravity system of heating will be used in this building. Cubic contents 161,581 cubic feet. Cost per cubic foot, 38.37 cents.

Armstrong Technical High School, located on P Street, between First and Third NW.: By the act of March 3, 1925, $50,000 was appropriated for enlarging the heating plant and the completion of the addition to this building. Contract was executed June 16, 1925, with M. B. Casey & Co. for making alterations in the heating and electrical systems of the power plant of this building in the sum of $29,049. The contract time for this work will expire September 16, 1925. The work to date is within the contract price.

Tuberculosis Hospital—addition to laundry, located on Fourteenth Street, between Shepherd and Upshur NW.: By the act of June 7, 1924, $7,500 was appropriated for the construction of an additional room for the laundry at the Tuberculosis Hospital. Contract was executed June 19, 1925, with the C. A. Hofferberth Construction Co. for the construction of this room, in the sum of $5,569. The contract time expires August 19, 1925. The cost of the work to date is $7,312.50.

National Training School for Girls, located at Muirkirk, Md.: By the act of February 28, 1923, the president of the board of trustees of the National Training School for Girls of the District of Columbia was authorized and directed to purchase a tract of land of not

more than 160 acres, situated in the District of Columbia or in the State of Maryland or in the State of Virginia, as a site for the use of said school, and the board of trustees were authorized to construct on said tract buildings of sufficient capacity to accommodate not more than 150 persons, the plans and specifications for such buildings to be prepared by the municipal architect of the District of Columbia. The purchase price for said tract of land, the erection of the said buildings, and all expenses incidental thereto not to exceed the sum of $62,000, which amount was appropriated for that purpose. By the act of March 4, 1925, $23,000 was appropriated as an additional amount for the construction of buildings, including necessary waterworks, electrical connections and sewage disposal. Contract was executed June 1, 1925, with the Frank E. Hartman Co. (Inc.), for the construction of a cottage in the sum of $42,410. The contract time for this work will expire December 1, 1925. The cost to date is within the original contract price.

District Training School, located near Laurel, Md.: By the act of June 29, 1922, the commissioners were authorized and directed to use a site for a home and school for feeble-minded persons, said site to be located in the District of Columbia on land owned by the District of Columbia and then allotted to the Home for the Aged and Infirm, and to erect thereon suitable buildings at a total cost not exceeding $250,000, and toward said purpose there was appropriated the sum of $100,000.

The act of February 28, 1923, repealed the provision in the act for the fiscal year 1923 authorizing the use of a site for this institution on lands owned by the District, contained in the District of Columbia, and authorized and directed the commissioners to acquire a site for a home and school for feeble-minded persons, said site to be located in the District of Columbia or in the State of Maryland or in the State of Virginia, and to erect thereon suitable buildings at a total cost not exceeding $300,000, of which not more than $38,000 should be expended for a site, and toward said purpose there was reappropriated the sum of $100,000 contained in the District of Columbia appropriation act for the fiscal year 1923 toward the erection of suitable buildings for said institution. The site acquired by the District is located near Laurel, Md. By the act of June 7, 1924, $30,000 was appropriated for continuing construction, and the commissioners were authorized to proceed with such construction by day labor or otherwise, as in their judgment might be most advantageous to the District, and to enter into contracts or otherwise to incur obligations on account of such construction not to exceed $232,000. By the act of March 3, 1925, an additional amount of $170,000 was appropriated for continuing construction, by day labor or otherwise, as might be considered most advantageous to the District.

On December 5, 1924, bids were received for the construction of a mess hall and dormitory. The bids were such that it was deemed advisable to construct the building by day labor, and a commissioners' order was issued authorizing the construction by day labor to be employed under the direction of the superintendent of the Home and School for the Feeble-Minded. Work was started January 8, 1925, and the building was completed July 8, 1925, at a cost of $28,034.11. Cubic contents, 129,877 cubic feet. Cost per cubic foot, 21.58 cents.

On May 5, 1925, the commissioners issued an order directing the municipal architect to proceed with the construction of new buildings for the District Training School by day labor. The structures immediately contemplated are three typical dormitory buildings, each to accommodate 60 inmates, and consisting of a ground floor and one story, of fireproof construction, with brick walls and slate roofs.

Ground was broken on May 20, 1925, and the materials of construction are rapidly being assembled. The work is progressing satisfactorily.

Besides the preparation of plans and specifications for the above-mentioned buildings, plans and specifications for about 50 other pieces of work, such as heating systems for engine houses, police stations, and school buildings, and equipment for various buildings, were prepared in the office of the municipal architect, the contract prices therefor amounting to $176,318.

The contracts entered into by this office for the fiscal year beginning July 1, 1924, and ending June 30, 1925, amounted to a total of $1,015,431.93.

The board of education have adopted a new policy with reference to graded schools, abandoning the 8-room cart-wheel type and adopting an extensible 16-room building with a combined assembly hall and gymnasium.

The plan of the building is in the form of the letter T. The central stem is occupied by the gymnasium; the two wings by eight classrooms each; and the central portion by the entrance, library, teachers' room, principal's room, medical and dental clinics, and study hall.

It is the wish of the board of education that this 16-room school be so designed that it may be built in one, two, or three sections; two 8-classroom sections, and a combined assembly hall and gymnasium section.

This provides for considerable flexibility in construction, permitting the erection of an 8-room or 16-room building with or without an assembly hall and adding later any remaining portions.

Of course, when built in separate units, the ultimate cost of the building is increased somewhat and when practicable it is desirable to build the complete unit at one time. Nevertheless, it is a distinct advantage to be able to build so as to adapt the school facilities to the needs of the community.

The Janney School is the first of this type of building to be built and comprises, at present, eight classrooms and an assembly hall. The remaining eight rooms will be added when the growth of the community makes this extension necessary.

The Calvert Street School, now under contract, is the second building and is similiar to the Janney, while the Brightwood, the third building of this type, a complete 16-room and assembly hall, has just been put under contract.

I would like to urge again that more thought be given to the study of grounds and approaches of the schools. Definite sums of money should be allotted each year to pay for planting, sodding, and upkeep of the properties. Some qualified person should be designated to advise on the treatment of the various sites, and plans

should be made to develop the possibilities of each individual piece of property. An estimate should also be prepared of the cost of the work involved.

At the present time only sufficient money is appropriated to erect the building; it is rare that a balance is left in the building appropriation sufficient to treat the grounds or provide for proper approaches, sidewalks, etc., after the building project is completed.

ALBERT L. HARRIS,
Municipal Architect.

To the ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF REPAIRS

WASHINGTON, D. C., *August 1, 1925.*

SIR: I have the honor to forward herewith my annual report showing the operations of this shop during the fiscal year ended June 30, 1925.

There was appropriated by Congress: Public schools of the District of Columbia 1925, repairs to buildings and grounds, $300,000, and a deficiency of $25,000, making the total moneys available for repairs to school buildings and grounds, $325,000. We expended during the year $325,000 and in order to do some emergency repair work which it was absolutely necessary to have done, we were compelled to deplete our stock by $32,281.85 and to use $15.20 deposited by the Parent Teachers' Associations for this class of work. We reserved a balance in the appropriation of $157.97 to pay any outstanding bills which may come in on account of excess delivery of material.

For fire department of the District of Columbia 1925, repairs to engine houses $25,000, all of which was expended.

For Metropolitan police of the District of Columbia 1925, repairs to stations $7,000, all of which was expended, except $474.81.

For repairs to police court $2,000, all of which was expended. We were given $3,000 of the police court of the District of Columbia 1925–26 appropriation, of which amount we expended $2,382.96 up to June 30, 1925. The remainder of this allotment is being expended at this time.

The foregoing amounts represent the actual cost of 4,330 separate jobs.

In addition to the work covered by the above appropriations which are under the supervision of the superintendent of repairs, this shop did $47,675.99 worth of work on various buildings controlled by other departments.

We inspected and repaired steam boilers in over 100 buildings owned by the District.

Modern lighting systems were installed complete, or in part, in 22 school buildings, and $9,500 has been set aside for the service installation in 31 schools. It is our intention to do the complete wiring of 36 schools this coming year which do not have any electric service whatever and to complete the wiring of 27 schools which to date are partially done.

No new heating plants were installed this year, but the hot-air heating plants in all of the schools were overhauled and repaired.

Our entire inspection staff is now equipped with motor transportation and we hope to render more efficient service during the coming year.

For several years we have been inviting attention to our urgent need for additional storage space at this shop for both materials and automobiles. We wish to report additional space for automobiles has now been provided and we are relieved to some extent. However, storage space is still badly needed.

The organization of the shop is the same as it was last year, with one exception, that being the office of overseer. The shop is composed of five annual employees—the superintendent, assistant superintendent, and three clerks—and from 115 to 225 per diem employees of the various trades. This number increases and decreases according to the seasons of the year and the amount of work in hand.

This shop wishes to make some public recognition of the loyal and efficient services rendered by the late Frank Yilek. Captain Yilek served in the capacity of overseer at this shop from 1919 until his death April 22, 1925, and his services and pleasing personality are missed at the repair shop.

The following comprise several extraordinary items paid for out of the school appropriation which were done at contract:

Fire escape for Gage School	$585
Repair to balustrade new Central High School	90
Repairs to bay window Wilson Normal School	4,250
Repairs to swimming pool new Central High	6,425
New guys for M Street heating plant	275

We have followed the practice of the last few years in compiling this report. Should more detailed information be desired we can furnish a detailed statement of the cost of every job or we can furnish the expenditures under each class of work on each and every building.

Respectfully submitted,

HENRY STOREY,
Superintendent of Repairs.

To the MUNICIPAL ARCHITECT.

REPORT OF CONSTRUCTING ENGINEER, DISTRICT OF COLUMBIA, WORKHOUSE AND REFORMATORY

LORTON, VA., *August 11, 1925.*

SIR: I have the honor to submit report of the operations of the construction division of the workhouse and reformatory for fiscal year ended June 30, 1925. Only a brief account of the work done is described here, and more detailed information may be furnished on request.

The principal work done during the year consisted of continuing work on the permanent buildings at the reformatory and workhouse, constructing a building and installing machinery for a new brick-making unit at the brickyard, and putting in service A section of the industrial railroad between the workhouse and reformatory, besides a number of repair jobs at both institutions.

REFORMATORY BUILDINGS

At the end of the fiscal year the status of the buildings was as follows: Buildings completed: 3 shops, Nos. 19, 20, and 21; 1 cell house, No. 17; 1 disciplinary dormitory, No. 18; and 1 boiler house, No. 28. Buildings complete except floors, heating, plumbing, etc.: 2 shop buildings, Nos. 22 and 23; 1 washhouse, No. 16; 3 dormitories, Nos. 13, 14, 15. Buildings under construction: 3 dormitories, Nos. 10, 11, 12, brickwork average 25 per cent complete; 1 mess hall, No. 27, brickwork 80 per cent complete. This group, when complete, will consist of 28 buildings; of these 16 are now under way or complete as described.

The new mess-hall building, No. 27, which is about ready for the roof, will be one of the finest buildings of its kind in this country, having a seating capacity in the dining room of more than 1,000 persons. This building will be provided with a complete modern bakery, a refrigeration plant, in addition to all the necessary modern appliances for the preparation of food and washing of dishes.

WORKHOUSE BUILDINGS

During the year the main structure of the first dormitory was completed and foundation put in of a second dormitory. A brick building was also constructed for the new brick machinery. The dormitories at the workhouse are considerably larger than those at the reformatory, and the class of prisoners engaged on this work do not apply themselves to the mechanical trades as readily as the longer-term inmates at the reformatory.

INDUSTRIAL RAILROAD

On October 13, 1924, the section of railroad between the workhouse and reformatory was put in operation and since that date all bricks and other building material have been hauled direct by railroad from Occoquan Creek to the reformatory.

Surveys have been made and work started clearing the line for the last section of this road between the reformatory and the main line of the Richmond, Fredericksburg & Potomac Railroad. When this section is completed coal can be shipped direct from the mines to the institution boilers saving handling charges on coal alone of more than $4,000 each year, besides providing a means of bringing in general supplies independent of river transportation.

BRICK PLANT

The brick plant produced several thousand more brick during the past year than were produced in any year in the past five years. The new brickmaking unit was practically completed and ready for operation at the close of the year. This addition will make the plant one of the finest of its kind in the East. It was designed for permanence, large production, and minimum maintenance cost. In addition to common bricks and rough texture face bricks, hollow tile can be made on this machine. Special provision has been made to readily change the screen plates, so as to provide a means of obtaining a fine clay for the better grades of brick. Its production will

be considerably larger than the kiln capacity, therefore every effort should be made to construct more kilns and recondition the present kilns now in service. With the manufacture of 6,000,000 bricks per year the output value would exceed $100,000 annually. A sum sufficient to carry on the construction work at both institutions. Thus the brick plant can be made to pay all construction expenses.

SHIPYARD

Provision for reconstructing the barges used in transporting coal and general supplies has been made. A floating dry dock was constructed from several abandoned barges. This provides a means of reconditioning the old barges more rapidly and under more favorable conditions.

The constucting engineer in addition to looking after the technical needs of the construction work has adopted a policy whereby considerable savings to the institution have been made as follows:

1. By locating and making preliminary arrangements for the transfer to this place of machinery, tools, etc., that are surplus in other departments of the Government.
2. By studying the needs of the industries and engineering activities so that economy is exercised in the purchase of material.
3. By devising means of increasing the output of industries and by introducing wherever possible the manufacture of new articles useful in construction.

Under paragraph 1, four practically new heating boilers of 150 horsepower each with a quantity of other mechanical equipment were secured at practically no cost to replace the condemned boilers at the workhouse boiler house. Estimated value of this equipment, $15,000.

Under paragraph 2, a saving in the purchase of fire brick and other repairs at the brickyard effected a saving of $840.

The above shows only the principal items on which savings were made but represents in money value more than three times the salaries paid to those employees who supervise construction work. The introduction of the manufacture of hollow tile at the brickyard will effect a saving of at least $400 on each dormitory building constructed. The operation of the new brick machinery with electric-motor drive will effect a saving in coal, lubricating oils, repairs, etc., of at least $10 for each day's operation. At the workhouse boiler house a large saving in coal consumption will be effected when the new boilers are put in service.

Respectfully submitted.

HERBERT R. HAAR,
Constructing Engineer.

To the MUNICIPAL ARCHITECT.

REPORT OF THE ELECTRICAL ENGINEER

WASHINGTON, D. C., *September 30, 1925.*

SIR: The annual report of the operations of the electrical department for the fiscal year ended June 30, 1925, is submitted herewith.

The work of the electrical department includes (*a*) the street lighting, electric and gas; (*b*) the municipal signals and communi-

cation systems; (*c*) the regulation of production, use and control of electricity for light, heat, and power purposes in the District of Columbia; (*d*) consultation and advisory service to other departments and divisions of the District government.

STREET LIGHTING

The street lighting system at the beginning of the fiscal year consisted of 21,823 lamps—11,519 gas and 10,304 electric (819 arc, 9,485 incandescent); on June 30, 1925, there were in service 22,567 lamps—11,861 gas and 10,706 electric (822 arc, 9,884 incandescent); a total increase of 744 lamps, compared with 567 in 1924. Of the 1,272 lamps newly connected (gross), 603, about 47 per cent, were either designation lamps or of the next lowest powered gas or electric. The increase in aggregate candlepower of the street-lighting system is from, approximately, 1,929,900 to, approximately, 2,183,400, about 13.1 per cent; of this increase, about 6.4 per cent is due to actual increase of plant and about 6.8 per cent to improved operation of the arc lamps. Production, in a small way, of lamp-posts and lamp-inclosing glassware of the new designs, referred to in previous report, has begun, a small installation has been completed, and more extensive use in the immediate future is planned.

ARC LIGHTING

There has been an increase of but 1 in the number of 6.6-ampere magnetite arc lamps and of but 2 in the number of 4-ampere magnetite arc lamps, to totals of 284 and 538, respectively, or 822 total arc lamps connected June 30, 1925. The use of higher grade electrode and of a different type of inclosing globe in and on the 4-ampere lamps has increased their effectiveness.

INCANDESCENT ELECTRIC LIGHTING

The number of incandescent lamps added (other than designation lamps) is 515, discontinued 135, a net increase of 380, being 197 of 60, 268 of 250, 25 of 400, and 25 of 600 candlepower. Of the incandescent lamps added, there were placed in New York Avenue (Seventeenth to Twentieth Streets) and in E Street (Eighteenth to Twentieth Streets NW.) 25 600-candlepower lamps; in Thirteenth Street (G to I Streets NW.), at Garfield Monument, and on south approach to Francis Scott Key Bridge 25 400-candlepower lamps; in Sixteenth Street NW. (at corners of intersecting streets, V Street to Meridian Place and between Randolph and Nicholson Streets), Seventeenth Street NW. (New York to Pennsylvania Avenues), Cathedral Avenue (Wisconsin to New Mexico Avenues), Naylor Road SE. (Good Hope Road to District line), Piney Branch Road NW. (Montague Street to Military Road), Fourteenth Street NW. on corners at street intersections (Taylor Street to Colorado Avenue), on Francis Scott Key Bridge, and small installations at various locations, 272 250-candlepower lamps; on Francis Scott Key Bridge and a few small installations, 68 100-candlepower lamps; variously located in newly improved sections, 224 60-candlepower lamps. The total number of incandescents (other than designation lamps) connected June 30, 1925, was 9,633, compared with 9,253 at the close of the preceding year.

MANTLE GAS LIGHTING

The number of mantle gas lamps added was 621, discontinued 273, a net increase of 348. The total mantle gas lamps connected June 30, 1925, was 11,478 (10,892 60-candlepower, 586 120-candlepower), compared with 11,130 (10,820 60-candlepower, 310 120-candlepower) at the close of the preceding year. The additions were individual or in small lots widely scattered. Of the 60-candlepower gas lamps, 386 were changed from upright to inverted mantle.

DESIGNATION LAMPS

The number of designation lamps added was 19, all electric, and the number discontinued was 6, all gas, a net increase of 13; of the 6 gas lamps discontinued, 1 was replaced by electric, 5 were displaced by substitution of street-designation signs on existing lamp-posts for gas-lighted signs on separate posts. The additions were scattered. The total of designation lamps connected June 30, 1925, was 634 (383 gas, 251 electric), compared with 621 (389 gas, 232 electric) at the close of the preceding year.

LIGHTING ALONG STEAM RAILROADS

The situation with respect to the several suits at law brought by the District of Columbia against certain railroad companies for payment of sums expended for the lighting of streets, avenues, etc., adjacent to their several rights of way remains essentially as reported for the past five years. The sum to be added in claim for the fiscal year is $9,946.88.

SIGNAL SYSTEM

The fire-alarm telegraph, the police-patrol signal, and the telephone systems have been operated and maintained, and each has expanded slightly to meet, in part at least, the growing requirements.

Fire-alarm boxes added to the system number 41 (29 public and 12 private), and 3 private boxes were discontinued, a net increase of 38, to a total in service June 30, 1925, of 844 (659 public, 185 private). Boxes connected by underground wires were increased by 28, to a total of 718, and boxes connected by overhead wires were increased by 10, to a total of 126.

Although there is the gratifying increase in number of boxes connected to the system of 38, as compared with 25 for the next preceding year, reference is invited to previous annual reports on serious need of more rapid extension of fire-alarm system as to boxes in the suburbs, and the recommendations therein are repeated. Our experience, and that of other cities, is that the fancied security of reliance on the telephone when in need of assistance in case of fire is of little value. With all possible precautions and efforts on the part of experienced fire-alarm operators, the excited condition of the person calling frequently results in failure to make a competent call.

MISCELLANEOUS

This department made specifications for and supervised the introduction of electric work in the following municipal properties:

Tuberculosis Hospital, specification for electric power and heating wiring; superintendent's residence, District Training School, near Annapolis Junction, Md., specification for lighting; caretaker's cottage, National Training School For Girls, Muirkirk, Md., specification for lighting.

This department prepared plans and specifications in the office of the municipal architect, District of Columbia, and supervised the introduction of electric work (where started) in the following municipal properties:

John F. Cook School, plans and specifications for lighting, power, telephones, and bell system. Temporary mess hall and dormitory, District Training School, near Annapolis Junction, Md., plans and specifications for lighting. Cottage, National Training School for Girls, Muirkirk, Md., plans and specifications for lighting. Engine house No. 29, District of Columbia fire department, plans and specifications for lighting. Truck house No. 15, District of Columbia fire department, plans and specifications for lighting.

While the preparation of plans and specifications for and the supervision of the introduction of electric work in municipal buildings has been transferred to the municipal architect, the electrical department retains not only the same regulative relation to such as to all electric wires and apparatus for light, heat, and power purposes in the District, but a close and cordial cooperative relationship.

The department also cooperated with various heads of departments and offices, determining the most advantageous schedule of service rate on new electric installations, canvassing for advantageous changes of schedule with changes of use conditions in old installations, partial audit of vouchers, inspecting, testing, advice on purchases, etc.

WARREN B. HADLEY,
Electrical Engineer.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1922

UNDER THE DIRECTION OF

COL. CHARLES KELLER
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

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1922

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OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1921

UNDER THE DIRECTION OF

COLONEL CHARLES W. KUTZ
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

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Report

OF THE OPERATIONS OF THE

Engineer Department

OF THE DISTRICT OF COLUMBIA

FOR THE YEAR ENDED
JUNE 30
1919

UNDER THE DIRECTION OF

LIEUT. COL. CHARLES W. KUTZ
Corps of Engineers, United States Army
Engineer Commissioner, District of Columbia

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

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